

Record of Decision

Marine Sediment/Management of Migration Operable Unit

McAllister Point Landfill Site

Naval Station Newport Newport, Rhode Island





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

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10-00119

MAR 3 2000

March 1, 2000

James Shafer, Remedial Project Manager
U.S. Department of the Navy
Naval Facilities Engineering Command
Northern Division
10 Industrial Highway
Code 1823, Mail Stop 82
Lester, PA 19113-2090

052613

Re: Record of Decision for the McAllister Point Landfill - Marine Sediment/Management of Migration

Dear Mr. Shafer:

I am enclosing the fully executed original of the Record of Decision for the McAllister Point Landfill - Marine Sediment/Management of Migration. As you know, a copy should be placed in the Administrative Record.

I appreciate your efforts in meeting this commitment and look forward to working with you and the Rhode Island Department of Environmental Management on the remedial design. Please do not hesitate to contact me at (617) 918-1385 should you wish to discuss this matter further.

Sincerely,

Kymberlee Keckler, Remedial Project Manager
Federal Facilities Superfund Section

Enclosure

cc: Paul Kulpa, RIDEM, Providence, RI
Melissa Griffin, NETC, Newport, RI
Mary Sanderson, USEPA, Boston, MA
David Peterson, USEPA, Boston, MA
★ Dianne Baxter, Tetra Tech-NUS, Wilmington, MA

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PART 1: DECLARATION

SITE NAME AND LOCATION

McAllister Point Landfill Site

Marine Sediment/Management of Migration Operable Unit (OU4)

Naval Station Newport

Middletown, Rhode Island

STATEMENT OF BASIS AND PURPOSE

This decision document presents the Selected Remedy for the Marine Sediment/Management of Migration Operable Unit at the McAllister Point Landfill, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record file for this site, which is available at the public libraries of Middletown, Newport, and Portsmouth, Rhode Island.

The Rhode Island Department of Environmental Management (RIDEM) concurs with the United States Department of the Navy's (Navy) and the United States Environmental Protection Agency's (EPA) remedial action decision for the McAllister Point Landfill Site. (See Appendix A for a copy of RIDEM's concurrence letter.)

ASSESSMENT OF THE SITE

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment.

DESCRIPTION OF THE SELECTED REMEDY

After careful study of the marine areas adjacent to the McAllister Point Landfill, the Navy has decided on cleanup alternatives for marine sediment at the site. No cleanup actions are recommended at this time for groundwater or landfill gas. However, the Navy will continue monitoring these media (as agreed to in the Source Control ROD signed in 1993) to assess the need for future actions.

The marine sediment cleanup actions will be conducted in two areas of the site. The first area is the nearshore and elevated-risk offshore (NS/ER) area which includes the intertidal zone and a subtidal area

south of the landfill that has high contaminant concentrations in sediment and risks similar to those identified for the intertidal zone. The second area is the remaining offshore (OS) area, which had lower contaminant concentrations than those in the NS/ER area.

Nearshore/Elevated-Risk Offshore Area

For the NS/ER area, the selected remedial action is based on alternative NS/ER-5 (Dredging and Disposal) as described in the Feasibility Study (February 1999) for the site. The selected alternative includes the following components, which will be performed by the Navy or its contractors:

Dredge and dewater contaminated sediment and debris. It is estimated that about 34,000 cubic yards of material will have to be dredged. Associated activities for this component are:

- Perform a pre-design investigation to confirm the extent of contaminated sediment and debris and assess the McAllister Point Landfill as a potential site to dispose of the dredged materials.
- Establish engineering controls to minimize sediment migration during dredging.
- Stabilize the seaward extent of the landfill before dredging.
- Excavate the contaminated sediment and debris from the shallow area south of the landfill.
- Dredge the contaminated sediment and debris from the remainder of the nearshore area.
- Screen the estimated 34,000 cubic yards of dredged material to separate large stones suitable for reuse and any debris that would be recycled or disposed separately. The separated materials would be handled as follows:
 - approximately 20% of the dredged material (rocks more than 6 inches in diameter) will be decontaminated and reused.
 - a small fraction of the dredged material (approximately 500 tons of large debris) will be decontaminated and sent off site for recycling or disposal.
 - the remaining dredged material would be dewatered and disposed at the McAllister Point Landfill and/or at an off-site location.
- Dewater the contaminated sediment and debris.

- Treat dewatered fluids as needed and discharge to the bay.

Dispose the contaminated sediment/debris at McAllister Point Landfill and/or in an approved off-site facility. Associated activities for this component are:

- Stage excavated sediment and debris at Pier 1 or another appropriate pier.
- Dispose sediments and debris at an off-base landfill - OR - Remove a portion of the existing cap and dispose contaminated sediments and debris in a new disposal cell on top of the existing landfill, until capacity is reached, and dispose any remaining sediments and debris at an off-base landfill.*
- Cap the expanded section of the landfill to the same standards as the existing cap (multi-layer cap with surface controls meeting state and federal hazardous waste management standards and all other ARARs identified for the cap in the 1993 ROD).
- * Note: The Navy plans to dispose sediment in McAllister Point Landfill only if there is a significant cost advantage to doing so. If most of the dredged materials are determined to be non-hazardous (as expected) and off-base disposal costs are comparable to or less than the estimated cost for disposal in McAllister Point Landfill, the Navy's preference is to dispose the materials off base.

Backfill the dredged area with clean material. Associated activities for this component are:

- Backfill the dredged area to the existing grade with clean sand, gravel, and rock similar to materials in the surrounding area to promote natural restoration of the aquatic community.
- Monitor site restoration and actively restore aquatic habitats that fail to naturally reestablish themselves.

Offshore Area

For the OS area, the Navy's Selected Remedy is based on alternative OS-2 as described in the Feasibility Study (February 1999) for the site. This remedy has the following components, which will be performed by the Navy or its contractors:

Conduct long-term monitoring and 5-year reviews. Associated activities for this component are:

- Monitor sediment and biota annually until it is determined by the Navy, EPA, and RIDEM that the monitoring frequency can be safely reduced.
- Review site conditions every 5 years to assess the effectiveness of the alternative.

The Selected Remedy removes the most contaminated wastes and sediments exceeding cleanup goals from the marine environment and isolates them in a landfill, thereby protecting people and the environment.

The Navy's Selected Remedy monitors the Offshore Area regularly, making sure that the contamination in this area does not adversely affect human health or the environment.

STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and resource recovery technologies to the maximum extent practicable.

Based on the extent and location of the contaminated sediments and the fact that the contaminated sediments are intermixed with solid waste (landfill) materials that require land disposal, the Navy, RIDEM, and EPA concluded that it was impracticable to segregate the materials and treat all of the chemicals of concern in a cost-effective manner. Thus the remedy for this site does not satisfy the statutory preference for treatment as a principal element of the site cleanup. Although about 20% of the dredged and excavated materials from the NS/ER area will be decontaminated and reused or recycled, the remaining 80% of the dredged material will be placed in a new cell of the McAllister Point Landfill or removed to another RCRA-approved landfill offsite. The low-level contaminated sediments of the OS area will be left in place and monitored to make sure they pose no threat to human health or the environment.

The Navy has determined, and EPA and RIDEM concur, that excavation and off-site disposal of the near shore and elevated risk off shore area, and monitoring of the offshore area is the least damaging practicable alternative in regards to the protection of aquatic habitats regulated under Section 404 of the Clean Water Act, 33 U.S.C. §1344. As required by applicable statutes, federal and state authorities will be consulted in regard to the protection of fish and wildlife, endangered species, coastal zone, and historic and archeological resources.

Because this remedy will result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after initiation of

remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

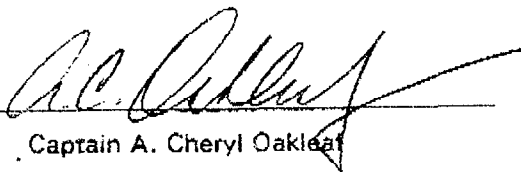
The following information is included in the *Decision Summary* section of this Record of Decision. Additional information can be found in the Administrative Record for this site.

- Chemicals of concern (COCs) and their respective concentrations
- Baseline risk represented by the COCs
- Cleanup levels established for COCs and the basis for the levels
- Current and future land and ground-water use assumptions used in the baseline risk assessment
- Land and ground-water use that will be available at the site as a result of the Selected Remedy
- Estimated capital, operation and maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the remedy cost estimates are projected
- Decisive factors that led to selecting the remedy (*i.e.*, how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria).

The foregoing represents the selection of a remedial action by the U.S. Department of the Navy and the U.S. Environmental Protection Agency, Region I, with concurrence of the Rhode Island Department of Environmental Management. Concur and recommend for immediate implementation:

U.S. Department of the Navy

By:



Captain A. Cheryl Oakleaf

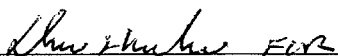
Date:

20 DEC 1999

Title: Commanding Officer
Naval Station Newport
Newport, RI

The foregoing represents the selection of a remedial action by the U.S. Department of the Navy and the U.S. Environmental Protection Agency, Region I, with concurrence of the Rhode Island Department of Environmental Management. Concur and recommend for immediate implementation:

U.S. Environmental Protection Agency

By:  FOR
Patricia L. Meaney

Date: 3/1/2000

Title: Director
Office of Site Remediation and Restoration
U.S. Environmental Protection Agency, Region I
Boston, MA

PART 2: DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

The McAllister Point Landfill Site is located in the central portion of the Naval Station Newport (NAVSTA Newport). The Navy is the lead agency for the cleanup of the site.

The NAVSTA Newport is approximately 60 miles southwest of Boston, Massachusetts and 25 miles south of Providence, Rhode Island. It occupies approximately 1,063 acres, with portions of the facility located in the City of Newport and Towns of Middletown and Portsmouth, Rhode Island. The facility layout is long and narrow, following the western shoreline of Aquidneck Island for nearly 6 miles facing the east passage of Narragansett Bay. A general location map of the NAVSTA Newport is provided as Figure 1.

The McAllister Point Landfill site itself is approximately 11.5 acres situated between Defense Highway and Narragansett Bay (see Figure 2). A right-of-way for the Rhode Island Department of Transportation (RIDOT) runs in a north-south direction along the eastern side of the site. Site access is from Defense Highway, through a gate in the south-central portion of the site. This Record of Decision relates to the marine sediments offshore of the landfill.

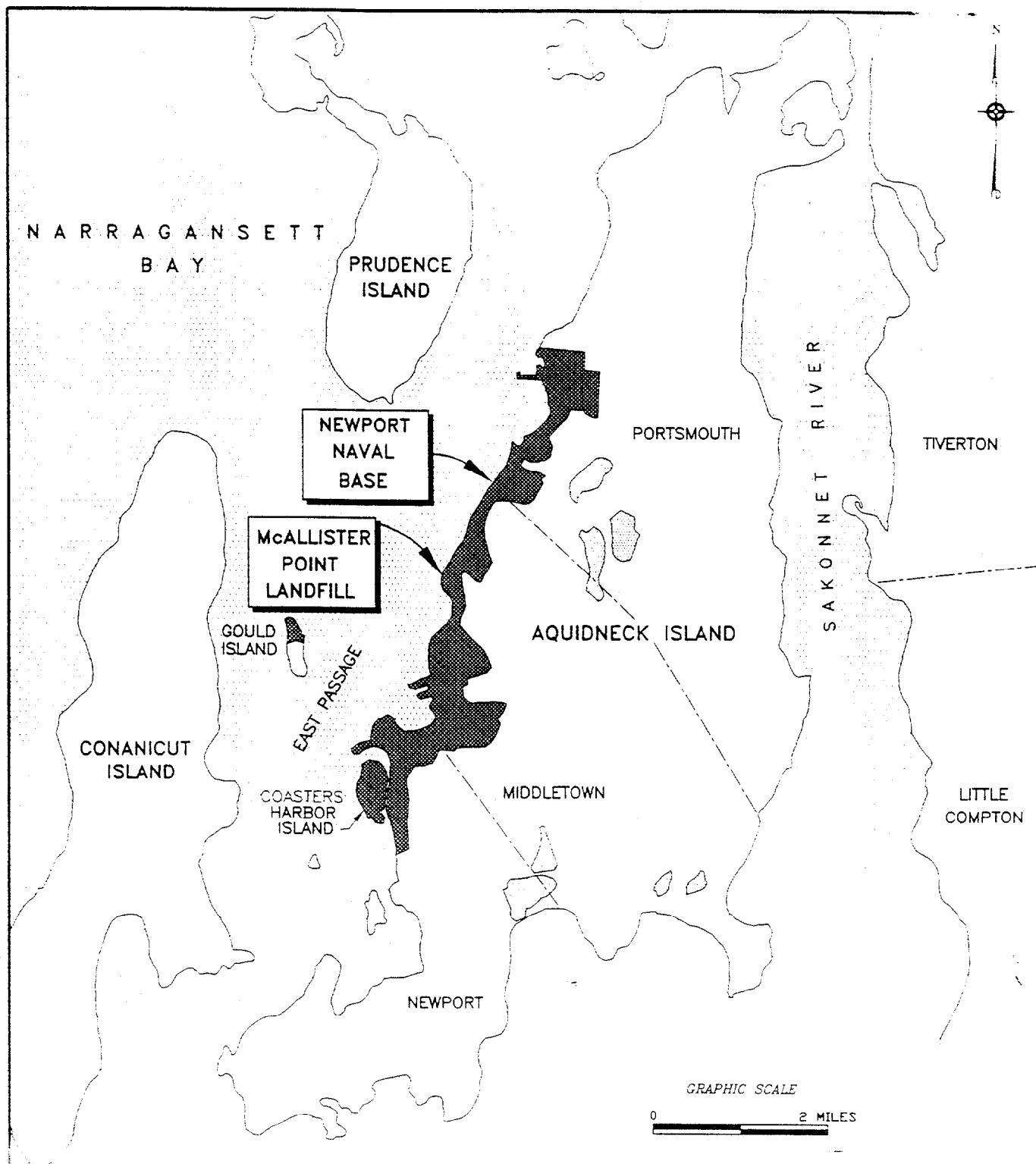
2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES


This section describes the site history and enforcement activities.

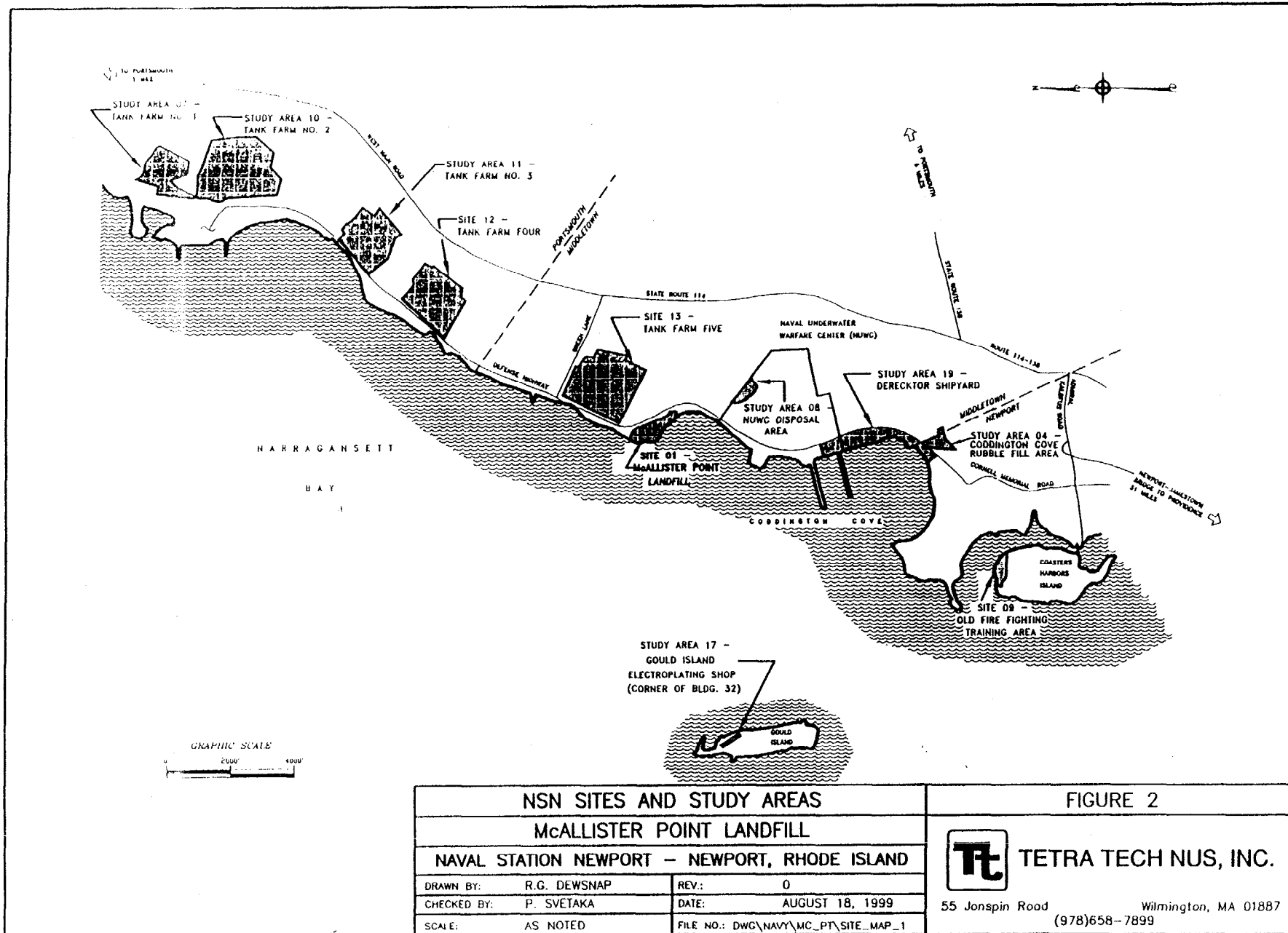
History

The NAVSTA Newport facility has been in use by the Navy since the era of the Civil War. During World Wars I and II, military activities at the facility increased significantly and the base provided housing for many servicemen. In subsequent peacetime years, use of on-site facilities was slowly phased out until Newport became the headquarters of the Commander Cruiser-Destroyer Force Atlantic in 1962. In April 1973, the Shore Establishment Realignment Program (SER) resulted in the reorganization of naval forces, and activity again declined.

The McAllister Point Landfill was used as a sanitary waste landfill over a 20-year period beginning in 1955, following the closure of the Melville North Landfill. As the site was used, the landfill was extended out into the bay using the wastes as fill material.



SITE LOCUS			FIGURE 1	
NAVAL STATION NEWPORT			 TETRA TECH NUS, INC.	
NEWPORT, RHODE ISLAND				
DRAWN BY:	R.G. DEWSNAP	REV.:	0	
CHECKED BY:	S. PARKER	DATE:	AUGUST 18, 1999	
SCALE:	AS NOTED	ACAD NAME:	\\DWG\NAVY\MC_PT\SITE_LOC_1	
			55 Jonspin Road Wilmington, MA 01887 (978)658-7899	



During the years the site was operational, it received all the wastes generated at the naval complex. This included wastes from all the operational areas (machine shops, ship repair, etc.), Navy housing areas (domestic refuse), and from the 55 ships that were homeported at Newport before 1973. The materials disposed in the landfill included construction debris, spent acids, paints, solvents, waste oils (diesel, lube and fuel), and PCB-contaminated transformer oil. The northern portion of the site was reportedly used to dispose submarine nets, anchors, buoys, and other materials from the World War II era (Parente, 1997).

In interviews conducted for the Initial Assessment Study (Envirodyne Engineers, 1983), operators of the landfill reported that it was common practice for barrels filled with liquids to be brought to the landfill. These barrels contained paints, oils, and other unidentifiable liquids. The barrels were crushed by a bulldozer before being covered. Base personnel also reported that at least two transformers, each of which contained approximately 100 gallons of PCB-contaminated oil, and at least four or five capacitors, were disposed in the landfill. The Superfund notification for McAllister Point Landfill indicated that PCBs were disposed at the site.

In the initial years, wastes were simply trucked to the site, spread with a bulldozer, and then covered. In the late 1950s or early 1960s, an incinerator was built at the landfill. From that time through about 1970, approximately 98 percent of all the wastes were burned before being disposed in the landfill. The incinerator was closed about 1970 as a result of the air pollution it was causing. During the remaining years that the site was operational, all wastes were again disposed directly into the landfill.

Operations at the site were discontinued in the mid 1970s. Thereafter, all wastes generated at NAVSTA Newport were disposed at the City of Newport's transfer station. A final covering of soil 3-feet thick was placed over the McAllister Point Landfill upon its closure.

Enforcement Activities

The entire NAVSTA Newport was listed on the U.S. Environmental Protection Agency (EPA) National Priorities List (NPL) of abandoned or uncontrolled hazardous waste sites in November 1989. The NPL identifies sites that pose a significant threat to the public health and environment. McAllister Point Landfill was listed as one of the sites requiring RI/FS activities. It was studied by the Navy under the Department of Defense Installation Restoration Program (IRP). This program is similar to the EPA's Superfund Program authorized under CERCLA in 1980, as amended by SARA in 1986. The selected remedy described herein meets the requirements of the CERCLA and the National Contingency Plan.

A Federal Facilities Interagency Agreement (FFA) for NAVSTA Newport was signed by the Navy, the State of Rhode Island, and the EPA on March 23, 1992. The FFA outlines response action requirements under the CERCLA and Department of Defense IRP at NAVSTA Newport. The FFA was developed, in part, to ensure that environmental impacts associated with past activities at NAVSTA Newport are thoroughly investigated and remediated, as necessary.

Following completion of the Phase I Remedial Investigation (RI) by the TRC Environmental Corporation, a ROD was signed in September 1993 that selected a multi-media, low permeability cap as a source control measure for the landfill. Cap construction commenced in 1995 and was completed in October 1996. The surface of the cap is vegetated and graded to promote runoff of precipitation, thus minimizing potential infiltration that could cause further leaching of landfill contaminants. The landfill slope facing Narragansett Bay is covered with a stone revetment to protect the cap from wave erosion. The capped area, excluding the revetment, is fenced; however, access to the shoreline adjacent to the landfill is not entirely restricted.

In April 1996, when cap construction resumed after a winter hiatus, it was noted that erosion had changed the shoreline and uncovered landfill materials present seaward of the new stone revetment. In November 1995, the surface of the intertidal zone (the zone between the mean low water and mean high water lines) in those areas consisted of sand and gravel. In April 1996, up to 1.7 feet of sand and gravel was absent from the surface in these areas, and landfill debris, consisting of wire, metal, concrete, asphalt, glass, and other material, was visible.

Subsequent investigations revealed that the landfill materials extend into Narragansett Bay well beyond the limits of the revetment. Based on data from offshore borings installed in 1996, the landfill materials are estimated to be up to 15-feet thick at the toe of the revetment and extend more than 100 feet into the bay in some locations.

Following these discoveries, an FS for Marine Sediment/Management of Migration (Tetra Tech NUS, 1999) was conducted for the site. The FS was based on several studies that assessed the nature and extent of contamination in marine sediments adjacent to the landfill, evaluated the human health and ecological risks posed by these sediments, and assessed the potential impact of landfill capping on groundwater quality and landfill gas generation. Results of these studies were presented in the *(Final) McAllister Point Landfill Marine Ecological Risk Assessment Report* (SAIC/URI, 1997) (the marine ERA); the *Technical Memorandum for Phase III Investigations, McAllister Point Landfill Marine Ecological Risk Assessment* (B&RE, 1997a) (the Phase III Technical Memorandum); the *(Draft Final) Remedial Investigation (RI) Report and Human Health Risk Assessment (HHRA)* (B&RE, 1997b); and the *McAllister Point Landfill Quarterly Monitoring Reports* (B&RE, 1997c and 1997d).

A Proposed Plan for marine sediment and management of migration at the site, which described the Selected Remedy, was released for public review and comment in June 1999. The public comment period lasted from June 14, 1999 until July 14, 1999. Section 3 of this ROD includes a summary of the comments received and the Navy's and EPA's responses to those comments.

2.3 COMMUNITY PARTICIPATION ACTIVITIES

In 1996 the Navy established a citizens advisory committee called a Restoration Advisory Board to assist the Navy in addressing Installation Restoration Program sites, such as the McAllister Point Landfill.

The FS for the marine sediments at the McAllister Point Landfill site was made available to the public in May 1999 and the Proposed Plan for the site was made available in June 1999. They can be found in the Administrative Record for this site and in the information repositories maintained at the Middletown, Newport, and Portsmouth, Rhode Island Public Libraries.

The notice of availability for the Proposed Plan was first published in the Newport Daily News and the Providence Journal – East Bay Edition on June 14, 1999. A public comment period on the Proposed Plan lasted from June 14 to July 14. An informational open house and Public Hearing was held on June 24, 1999 to present the Proposed Plan to the public and to solicit comments on the Navy's Selected Remedy. Representatives from the Navy, EPA, and the RIDEM were available at the meeting to discuss the public's questions and concerns about the site.

The Navy's responses to the comments it received during the comment period are included in the Responsiveness Summary, Section 3 of this Record of Decision.

2.4 SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

As with many Superfund sites, the problems at Naval Station Newport and specifically at McAllister Point Landfill are complex. As a result, the Navy has divided the analysis and cleanup of the base into pieces, called Operable Units. The onshore portion of the McAllister Point Landfill comprises Operable Unit 1. The marine sediments offshore of the McAllister Point Landfill, addressed in this ROD, comprise Operable Unit 4.

The Navy and EPA selected and implemented a cleanup remedy for the onshore portions of the landfill (Operable Unit 1) in a ROD signed on September 22, 1993. This remedy included capping of the landfill with a multi-layered cap that complies with state and federal hazardous waste management standards,

instituting surface controls to minimize erosion and manage runoff, instituting landfill gas monitoring/controls, conducting groundwater monitoring, and using fencing and deed restrictions to limit site access and future use. The ROD also required investigation of the sediments offshore of the landfill. Construction of the cap began in 1995 and was completed in October 1996.

As described in Section 2.2 above, during the construction of the landfill cap it was noted that potentially contaminated landfill material extended into nearshore and offshore marine areas. Subsequent tests confirmed the presence of contamination and this ROD addresses the contamination of these areas. A human health risk assessment and a marine ecological risk assessment were conducted for the nearshore and offshore areas. The human health risk assessment concluded that frequent or long-term consumption of mussels and clams taken from the nearshore areas off McAllister Point Landfill presents a potential risk to people who eat those shellfish. The ecological risk assessment identified increased probability of risk to aquatic life and shore birds exposed to landfill-related contaminants in the sediment and the tissue of prey species. Polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and a few metals were identified as the contaminants of greatest concern.

The Source Control ROD for the onshore portion of the landfill was intended to prevent landfill contaminants from coming into contact with the environment. The Selected Remedy presented in this ROD is expected to be the final response action for this site since it addresses the major landfill contaminants that were not contained by the initial landfill cap. These materials will be dredged, dewatered, and disposed in appropriately designed landfill facilities on- or off-site. The area will be monitored closely to ensure that it poses no threat to the environment. A monitoring plan will be developed during remedial design.

Groundwater and landfill gas concerns at the site are not addressed in this ROD. Ongoing monitoring of both groundwater and landfill gases is being conducted under the previous source control ROD. Based on data analyzed so far, neither groundwater nor landfill gases at the site pose an unacceptable risk to human health or the environment. The Navy plans to continue sampling and monitoring these elements of the site to ensure compliance with all relevant laws and regulations; however, no remedial actions are anticipated at this time.

2.5 SITE CHARACTERISTICS

The McAllister Point Landfill is about 11.5 acres situated between the Defense Highway and Narragansett Bay on the NAVSTA Newport. The landfill is directly adjacent to the shoreline of Narragansett Bay. This ROD addresses nearshore and offshore areas within Narragansett Bay (approximately 47 acres) adjacent to the landfill which either contain landfill material or have been contaminated by runoff or sedimentation from the landfill before it was capped.

Investigations of the coastal areas adjacent to the McAllister Point Landfill concluded that landfill materials intermixed with contaminated sediment are present seaward of the landfill along much of its length and extend out as far as 100 feet from the revetment in the central portion of the landfill. The landfill materials are estimated to be up to 15 feet thick at the revetment in the central portion of the landfill and taper to less than 1 foot at the north and south ends of the landfill. These landfill materials are the source of marine sediment contamination at the site.

The nearshore area is defined as the coastal area adjacent to McAllister Point Landfill that lies between the landfill revetment and the -3 foot mean low water line (water depth = 3 ft at MLW), and any additional areas outside the -3 ft MLW line that contain landfill materials at depth. The offshore area is the coastal area outside the intertidal zone, but still within proximity of the landfill. Surface and core sediment sampling of these areas was conducted by SAIC/URI in 1994 (Phase I) and 1995 (Phase II) to support a marine Ecological Risk Assessment. Additional sediment sampling was conducted by B&RE in 1996 (Phase III) to assess changes in contaminant conditions due to sediment erosion in the nearshore area following construction of the landfill revetment. The Phase III investigation included subsurface exploration seaward of the revetment to determine the thickness of landfill material in the intertidal zone. Details of these investigations are presented in the marine ERA (SAIC/URI, 1997) and Phase III Technical Memorandum (B&RE, 1997).

The sampling found that the sediment in both the nearshore and offshore areas along the length of the landfill contained PCBs, PAHs, and metals at concentrations exceeding benchmark values for adverse ecological effects due to contamination in sediment (the U.S. Department of Commerce National Oceanic and Atmospheric Administration's (NOAA's) Effects Range-Median (ER-M) and Effects Range-Low (ER-L) adverse effects benchmark values). Additionally the nearshore area contains landfill debris, which includes small materials such as ash, glass, pottery, brick, and metal pieces, and larger debris such as large metal pieces, concrete and submarine netting. Under the requirements of state and federal hazardous waste management standards this landfill debris must be either removed or suitably capped to prevent washout into the marine environment.

Human Health and Ecological Risk Assessments conducted for the site concluded that the contamination in the marine sediment at the site poses an unacceptable human health risk to people who consume shellfish taken from the site, and poses potential risks to marine organisms and shore birds that are exposed directly to the sediments or eat prey species contaminated by the sediment (see Section 2.7 for details of the risk assessments).

Groundwater monitoring of the landfill area was conducted by Foster Wheeler Environmental Corporation (FWENC) in March 1997, July 1997, September 1997, and January 1998 as part of the operations and maintenance (O&M) monitoring of the landfill required by the 1993 McAllister Point Landfill source control ROD. Evaluation of the monitoring data indicates the presence of Volatile Organic Compounds (VOC), Semi-Volatile Organic Compounds (SVOC), and metals in both shallow and deep (bedrock) groundwater monitoring wells sampled at the site. Contaminant concentrations in site groundwater were generally lower than state GA aquifer groundwater standards, with a few exceptions. Groundwater classified GA is known or presumed to be suitable for drinking water without treatment. One shallow well on site (MW-103S) exceeded the state GA standard for benzene during the March, 1997 sampling round (GA = 5 µg/l, concentration measured during sampling round = 12 µg/l). Metals (inorganic analytes) were present at concentrations greater than the GA standard in the following wells: lead (GA = 15 µg/l) in MW-101R (19.8 µg/l) and MW-103S (44.3 µg/l); arsenic (GA = 50 µg/l) in MW-103S (76.4 µg/l), MW-107R (311 µg/l), MW-108R (65 µg/l), and MW-111R (120 µg/l); antimony (GA = 6 µg/l) in MW-103S (6.1 µg/l); and nickel (GA = 100 µg/l) in MW-103S (346 µg/l). All wells have shown a decrease in the respective metals concentrations in the most recent sample round (January 1998), except for lead in MW-103S, which has shown a slight increase. Generally, the concentrations of contaminants detected in these sampling rounds were lower than those measured during the RI in 1993, and are generally comparable between sample rounds.

An evaluation of post-cap groundwater data and marine sediment ecological risk data was conducted during the Feasibility Study to assess whether discharge of site groundwater is contributing to the ecological risk associated with marine sediments at the site. The results of the evaluation indicated that groundwater is not a significant source of the contaminants that contribute to unacceptable risk in sediments.

The lateral extent of sediment contamination to be addressed by the selected remedy is depicted on Figure 3. A simplified cross-sectional view of the nearshore materials to be removed is depicted on Figure 4. The concentrations of contaminants, as noted above, are at levels that can affect the ecology of the local marine environment. Because the contaminants are contained in sediments in intertidal and offshore areas, human contact with them would likely be limited. However, the consumption of

contaminated shellfish and/or direct contact with the sediment by recreational users of the site are potential pathways of human exposure to the contaminants of concern. Although site access is restricted and the area is under a state-imposed shellfishing ban (due to municipal sewage discharges to Narragansett Bay), there is a chance of human exposure to the contaminated sediments through these pathways.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

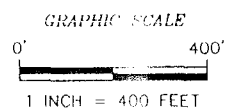
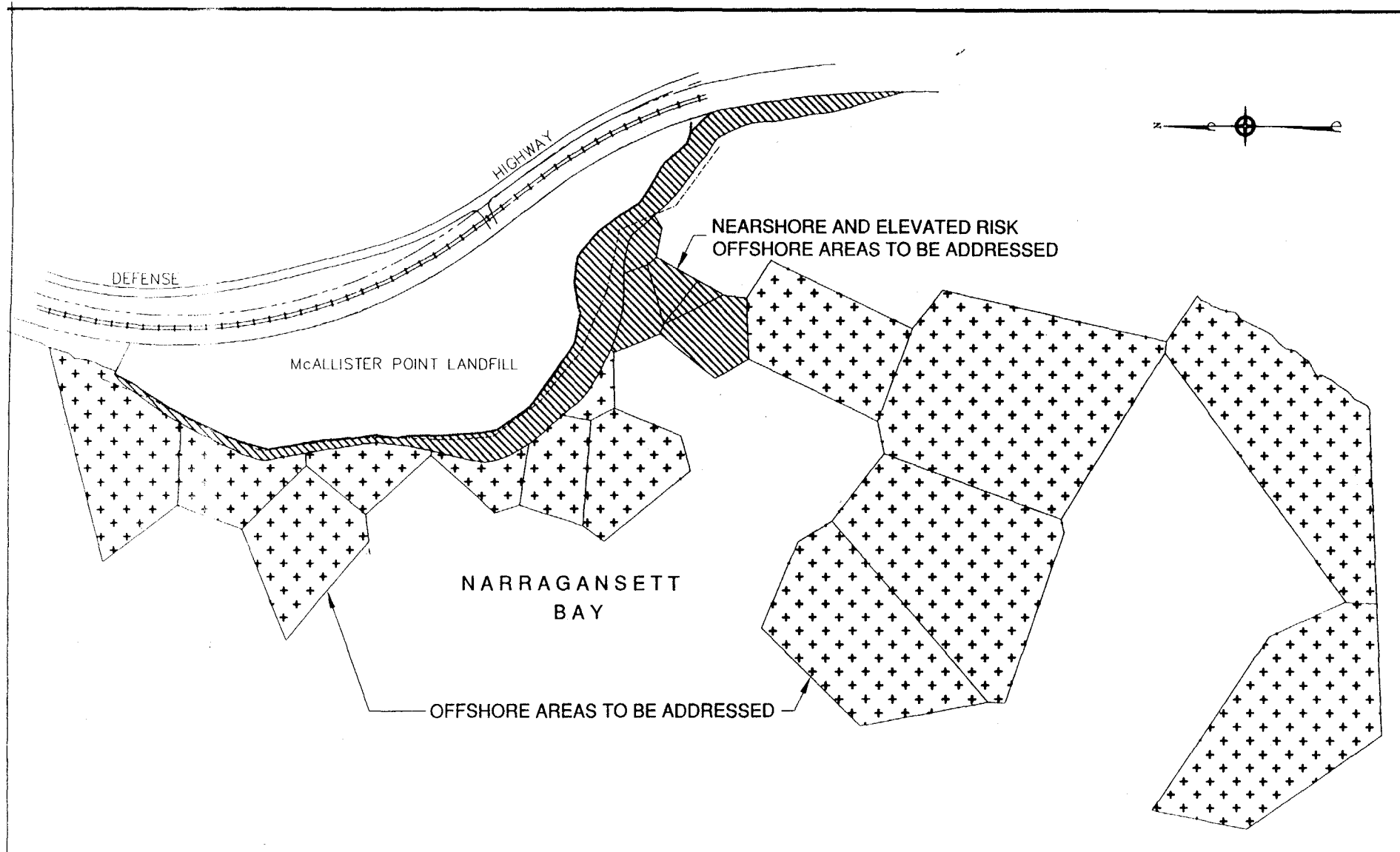
The land adjacent to the marine areas discussed in this ROD is the site of the McAllister Point Landfill. Institutional controls instituted as part of the landfill cleanup prevent future use of the site as anything other than a landfill.


As noted above, Rhode Island Department of Environmental Management (RIDEM) has designated the area of Narragansett Bay along the NAVSTA Newport shoreline, including McAllister Point Landfill, as a shellfish closure area due to known or potential sewage discharges in the area. However, the effectiveness of the ban for preventing shellfishing is uncertain and the ban applies only to a few species of shellfish (bivalves only); it does not apply to lobster or finfish. Therefore, use of this area for shellfishing, while neither legal nor advisable, cannot be ruled out as a potential future use.

The RIDEM has classified groundwater in Rhode Island to protect the quality of the state's groundwater resources for use as drinking water and other beneficial uses, and to ensure protection of the public health and welfare, and the environment. Groundwater at the McAllister Point Landfill has been classified as GA Non-attainment (GA-NA). Groundwater classified GA is known or presumed to be suitable for drinking water without treatment. Non-attainment (NA) areas are those areas that are known or presumed to be out of compliance with the standards of the assigned classification. The goal for non-attainment areas is restoration to a quality consistent with the classification. However, the long-term presence of the landfill at this site and its coastal location (salt water intrusion) may preclude this goal from being achieved.

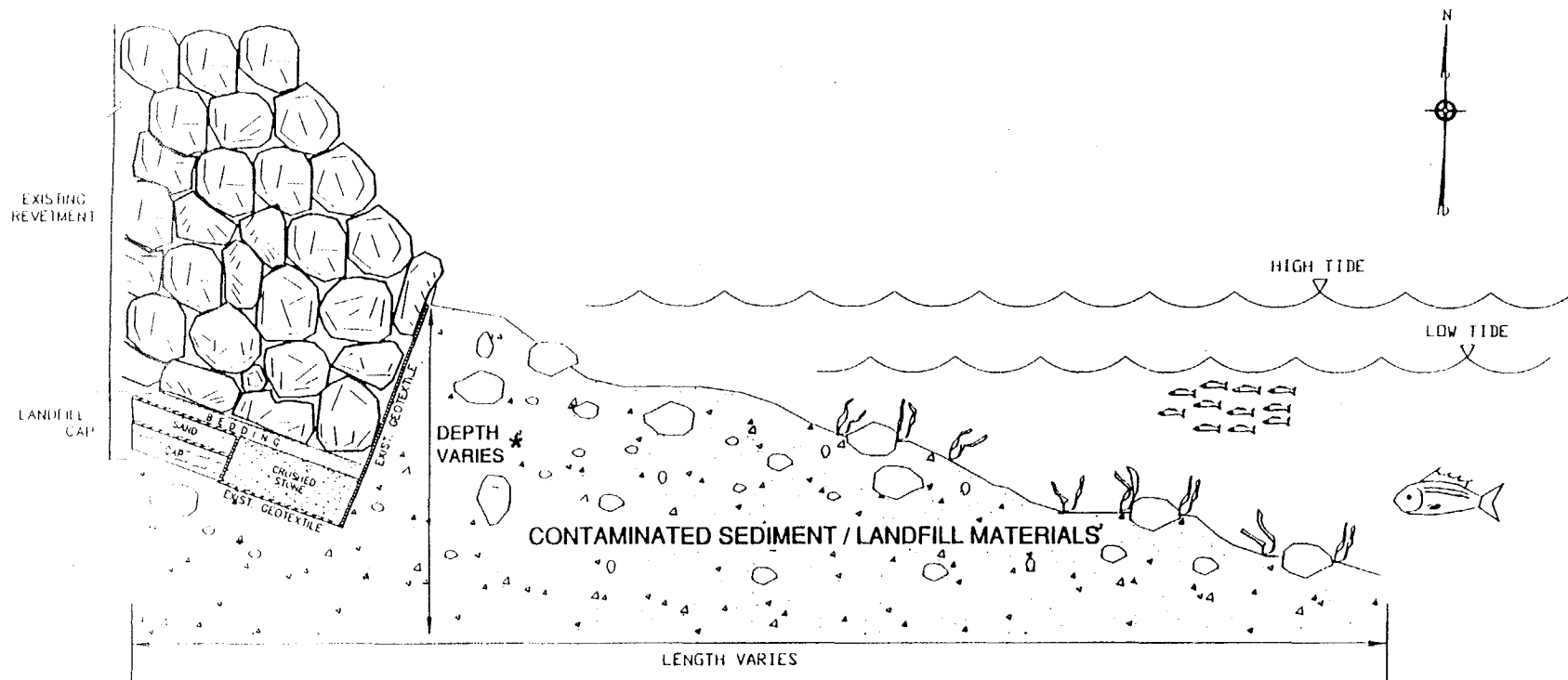
2.7 SUMMARY OF SITE RISKS

A baseline risk assessment provides the basis for taking remedial action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline human health and ecological risk assessments developed for this site.




AREAS TO BE ADDRESSED BY SELECTED REMEDY			FIGURE 3		
McALLISTER POINT LANDFILL			 TETRA TECH NUS, INC.		
NAVAL STATION NEWPORT – NEWPORT, RHODE ISLAND					
DRAWN BY:	R.G. DEWSNAP	REV.:			0
CHECKED BY:	D. McKENNA	DATE:			NOVEMBER 10, 1999
SCALE:	1" = 400'	FILE NO.:	\DWG\NAVY\MC_PT\FIG_3.DWG		

55 Jonspin Road	Wilmington, MA 01887
(978)658-7899	



* THICKNESS OF CONTAMINATED SEDIMENT / LANDFILL MATERIALS VARIES IN DEPTH FROM 0 - 15 FEET ALONG THE EDGE OF REVETMENT

NOT TO SCALE

NEARSHORE AREA CROSS SECTION VIEW			FIGURE 4	
McALLISTER POINT LANDFILL				
NAVAL STATION NEWPORT – NEWPORT, RHODE ISLAND				
DRAWN BY: R.G. DEWSNAP		REV.: 0		
CHECKED BY: D. McKENNA		DATE: 18 AUG 99		
SCALE: NOT TO SCALE		FILE NO.: \DWG\NAVY\MC_PT\FIG_4.DWG		
			<div> TETRA TECH NUS, INC.</div> <div>55 Jonspin Road Wilmington, MA 01887 (978)658-7899</div>	

Summary of the Human Health Risk Assessment

TRC (1994b) and B&RE (1997b) developed Human Health Risk Assessments (HHRA) for the site during the Phase II and Phase III investigations. The risk assessments evaluated the health risks posed to people by contamination in the marine sediments at the site. The assessments considered the most likely exposure scenarios expected for the site as it exists now and as it is expected to be used in the future. This section summarizes the findings of the risk assessments relevant to selection of the marine sediment remedial action for the site. Table 1 presents a summary of site risks.

The exposure scenarios considered in the risk assessment included ingestion of contaminated shellfish by recreational and subsistence fishermen and children, and dermal contact with contaminated sediment during recreational use of the intertidal zone and walking along the shoreline. The assessment concluded that dermal contact with contaminated sediment did not pose unacceptable risk to people walking or wading at the site. Ingestion of contaminated shellfish from the site was found to pose unacceptable human health risk.

The principal cancer risks in the nearshore and elevated-risk offshore areas were determined to be from arsenic through ingestion of shellfish. Subsistent fishermen would have the greatest elevated risk of cancer, followed by children and adults who occasionally eat shellfish from the site. For subsistent fishermen, PCBs and PAHs also contribute to increased cancer risks. For children, PCBs also contribute to increased risk.

RIDEM determined that the cleanup goals established in *Section 2.8, Remediation Objectives, Table 2* meet the cumulative excess lifetime cancer risk established in the *Rhode Island Rules and Regulations for the Investigations and Remediation of Hazardous Material Releases (DEM-DSR-01-93) ("the Rules")* (see letter dated May 28, 1999).

The principal non-cancer risks identified for the nearshore and elevated-risk offshore areas are also from arsenic through ingestion of shellfish. Again, subsistent fishermen would have the greatest elevated risks. Children show increased non-cancer risks due to arsenic and lead. Subsistent fishermen also show increased non-cancer risks due to copper, cadmium, zinc, and mercury.

As discussed previously, the area of Narragansett Bay along NAVSTA Newport has been designated by RIDEM as a shellfish closure area due to known or potential sewage discharges in the area. However, the effectiveness of the ban for preventing shellfishing is uncertain and the ban applies only to a few species

TABLE 1
SUMMARY OF HUMAN HEALTH RISKS
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCCALLISTER POINT LANDFILL, NSN, NEWPORT, RHODE ISLAND

Pathway	Type	Ingestion of Mussels	Ingestion of Clams	Ingestion of Sediment	Dermal Contact with Sediment
		Calculated Ranges of Cancer Risks and Hazard Indices			
Adult Recreational Shellfishing	Cancer Risk Hazard Index	2E -04 to 3E -04 1.0 to 1.0	2E -04 to 2E -04 1.0 to 1.0		
Adult Subsistent Shellfishing	Risk Hazard Index	9E -04 to 5E -03 4.0 to 10	6E -03 to 8E -03 30 to 40		
Child Recreational Shellfishing	Risk Hazard Index	2E -05 to 1E -04 0.5 to 2.0	1E -04 to 2E -04 4.0 to 5.0		
Adult Recreational Visitor	Risk Hazard Index			2E -07 to 7E -07 9E -04 to 0.01	2E -09 to 8E -08 1E -07 to 9E -06
Child Recreational Visitor	Risk Hazard Index			3E -07 to 1E -06 8E -03 to 0.1	1E -09 to 7E -08 5E -07 to 4E -05

of shellfish (bivalves only); it does not apply to lobster or finfish. Therefore, despite the ban, there is a possibility that people may consume contaminated shellfish taken from the area.

The estimated risks from eating contaminated shellfish from the site are presented in greater detail below. For the purposes of the risk assessments the site was divided into several sections – or zones. The risks were calculated using average concentrations and maximum concentrations detected in each of these zones. This approach provided an average case or central tendency (CT) risk and a reasonable maximum exposure case (RME) risk for each zone.

Consumption of Shellfish by Recreational Fishermen: Ingestion of mussels and clams was associated with cancer risks ranging from 2E-04 to 3E-04 for adults who consume 3 meals per year of shellfish taken from the site. Arsenic, several carcinogenic PAHs, and Aroclor-1254 in mussels; and arsenic, beryllium, several carcinogenic PAHs, and Aroclor-1254 in clams were associated with individual cancer risks above 1E-06. The non-cancer HIs for this scenario do not exceed 1.0.

Consumption of Shellfish by Subsistent Fishermen: Ingestion of mussels and clams was associated with cancer risks ranging from 9E-04 to 8E-03 for adults who consume approximately 37 meals per year of shellfish taken from the site. Arsenic and PCBs were the primary contributors to cancer risk due to ingestion of mussels and clams; however, several carcinogenic PAHs were also associated with individual cancer risks above 1E-06. The non-cancer HIs for this scenario ranged from 4.0 to 40. Arsenic is the primary contributor to this adverse health hazard index across most of the site. Cadmium, copper, mercury, and zinc also have HIs greater than 1.0 in some areas. Adverse health effects cannot be ruled out for subsistent fishermen ingesting shellfish from the nearshore or elevated-risk offshore areas.

Consumption of Shellfish by Children (non-subsistence): Ingestion of clams and mussels was associated with cancer risks ranging from 2E-05 to 2E-04 for children who consume 3 meals per year of shellfish taken from the site. Arsenic and PCBs were associated with individual cancer risks above 1E-06 from ingestion of mussels. Arsenic was associated with individual cancer risks above 1E-06 from ingestion of clams. Several carcinogenic PAHs were also associated with individual cancer risks above 1E-06 under some cases. The non-cancer HIs for this scenario ranged from 0.5 to 5.0. Arsenic is the primary contributor to HIs greater than 1.0. In one area of the site cadmium and copper also contribute to the HI exceeding 1.0. Adverse non-cancer health effects cannot be ruled out for children ingesting shellfish from the nearshore or elevated-risk offshore areas.

EPA's Integrated Exposure and Uptake Biokinetic Model (IEUBK) was used to evaluate potential exposure risks from lead in soil, dust, water, air, and shellfish for future children (ages 0 through 6 years) living

nearby and consuming shellfish from the site. The predicted percentage of children with blood lead concentrations above the guideline of 10 µg/dl (based on the site shellfish concentrations and default values for lead in air, water, and soil) ranged from 2.25 to 45.1 percent for different areas of the site. The predicted levels were lower than the acceptable level of 5 percent in most areas of the site, but exceeded the acceptable level in one area of the nearshore (along the central portion of the landfill). Therefore, it is not possible to rule out adverse effects based on lead exposure to children aged 0 to 6 years from ingestion of shellfish taken from the nearshore area.

Results of the Ecological Risk Assessment

SAIC and URI (1997) conducted a marine Ecological Risk Assessment (ERA) which focused on the risks to the marine environment from chemicals associated with the McAllister Point Landfill. This section provides a summary of the methods and conclusions of the marine ERA.

The marine ERA incorporated field investigations and modeling approaches to develop an assessment of potential risks to a variety of indicator species. The investigations included surveys of the marine habitat and populations in the area, chemical analysis of sediment and marine organisms, and toxicity testing. Additionally, studies describing benthic communities within Narragansett Bay were reviewed to provide background information for this assessment.

The marine ERA incorporated the assessment of several exposure and effects endpoints within a line of evidence framework. There were six lines of evidence in the exposure assessment, which included: comparison of sediment contaminant concentrations to benchmark values, comparison of porewater concentrations to water quality criteria, assessment of bioavailability of metals in sediments, assessment of fecal pollution indicator concentrations in sediments, evaluation of contaminant concentrations in marine organism tissue relative to concentrations in organisms taken from a reference location in the bay, and assessment of bioaccumulation and ecological exposures through the food chain.

Correspondingly, there were three lines of evidence in the effects assessment, which included: evaluation of sediment and porewater toxicity to aquatic organisms and comparison of these results to contaminant concentrations in sediments and porewater; evaluation of field effects indicators (bivalve condition index, benthic community structure, and fecal pollution indicators in tissue) and comparison of these results to contaminant concentrations and assessment of ecological effects from contaminant uptake through ingestion of contaminated prey items.

Each line of evidence has multiple supporting indicators, such as analyte-specific hazard quotients for sediments and porewater, tissue concentration ratio (TCR) values for each of the aquatic receptors, and amphipod and sea urchin toxicity. These indicators were used to increase the certainty of the assessment with regard to the presumption of adverse exposure or effects conditions. The individual indicators within each line of evidence were interpreted and summarized using semi-quantitative ranking schemes that allow the synthesis of the overall probability of adverse exposure/effects. In the final step of the evaluation, the findings of exposure and effects indicators within each line of evidence were evaluated jointly to interpret the overall probability of adverse ecological exposure effects in each zone within the study area.

The classification of overall ecological risk for the McAllister Point Landfill offshore areas is divided into high, intermediate, low, and baseline categories. The risk probability rankings are defined as follows:

High Risk Probability: Numerous lines of evidence suggest pronounced contaminant exposure and effects, the spatial extent of the apparent impact is great, the impact is likely to be persistent over long periods of time, and the available data support demonstrable exposure-response relationships.

Intermediate Risk Probability: Multiple lines of evidence suggest that measurable exposure or effects -- but not both -- are occurring. Typically, quantitative exposure-response relationships are lacking. The spatial extent of the apparent impact may be highly localized or occur for a very limited duration.

Low Risk Probability: Possible, but minimal impacts based on some of the exposure or effects-based lines of evidence, while impacts are undetectable by the majority of exposure and effects-based lines of evidence. Typically, demonstrable exposure-response relationships are lacking.

Baseline Risk Probability: The probability of adverse exposure and/or ecological effects is equivalent to that from contamination and other environmental conditions not associated with the site.

The marine ERA concluded that the primary contaminant source contributing to ecological risk in the marine environment near McAllister Point Landfill was the landfill itself, as indicated by the distribution of contaminants, and the risk determined by the lines of evidence measured. The highest concentrations of landfill-related contaminants-of-concern (COCs) were found in the shallower areas of the south/central portions of the study area. These are the areas where landfill deposits are the largest, where the shoreline was extended due to landfill expansion. These are also the areas that are most susceptible to wave action and erosion.

The routes of COC transport are most likely from erosion and resuspension of in-place contaminants. Prior to cap construction, surface water runoff and seep water percolating out of and through the landfill above grade are expected to have been more important sources of COCs than under current conditions.

The principal contaminants contributing to elevated ecological risk from marine sediments at the site are PCBs, PAHs, and metals (arsenic, copper, nickel, and lead). The overall risk probabilities for the different areas of the site are summarized below.

Nearshore area – A high probability of landfill-related COC risk to infaunal benthic communities, shore birds, blue mussels, and fish was identified in the nearshore area along the most of the landfill shoreline. Intermediate probability of landfill-related COC risk to infaunal benthic communities, shore birds, blue mussels, and fish was identified at the northern and southern ends of the nearshore area.

Elevated-risk offshore area – Intermediate probability of landfill-related COC risk to infaunal benthic communities, shore birds, blue mussels, and fish was identified in the elevated-risk offshore area (an intertidal and subtidal zone south of the landfill).

Offshore area – Intermediate and low probabilities of landfill-related COC risk to infaunal benthic communities, shore birds, blue mussels, and fish were identified in the offshore area.

Risk Assessment Summary

The human health and ecological risk assessments for the site revealed that the contaminants in marine sediments in the nearshore and elevated-risk offshore areas pose potential risks to both humans and the environment. An unacceptable human health risk was identified for people who consume shellfish taken from these areas. High and intermediate probabilities of ecological risks were identified for marine organisms and shore birds exposed to landfill-related contaminants through contact with marine sediment and through ingestion of prey species.

The ecological risk assessment revealed that the contaminants in marine sediments in the offshore areas pose potential risks to the environment. Intermediate and low probabilities of ecological risks were identified for marine organisms exposed to landfill-related contaminants through contact with marine sediment and through ingestion of prey species. No risk to shore birds was identified for the offshore areas. A human health risk assessment was not performed for the offshore area because the depth of water makes the area inaccessible for direct contact exposures or non-commercial shellfishing.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present a threat to public health, welfare, or the environment.

2.8 REMEDIATION OBJECTIVES

For the purposes of developing remedial action objectives (RAO), the coastal area adjacent to the McAllister Point Landfill was divided into three sections. These sections are shown in Figure 3.

Nearshore area: The nearshore area is the coastal area adjacent to McAllister Point Landfill that lies between the landfill revetment and the -3 foot mean low water line (water depth = 3 ft at MLW) and any additional areas outside the -3 ft MLW line that contain landfill materials beneath the surface. This area had among the highest risks identified at the site. Sediments in this area pose potential unacceptable risks to humans and ecological receptors. Landfill debris is believed to be present beneath the surface of the sediments in this area.

Elevated-risk offshore area: The elevated-risk offshore area is the subtidal area south of the landfill that includes sample stations MCL-12, S2B, S2C, and OS-28 (see also Figure 3). This area had some of the highest observed contaminant concentrations detected in the study area. Sediments in this area pose potential unacceptable risks to humans and ecological receptors.

Offshore area: The offshore area is the remaining subtidal area within the study area. No human health risks are expected in this area because the depth of water makes the area inaccessible for direct contact exposures or for shellfishing. Sediments in this area pose lower risks to ecological receptors than sediments in the other areas of the site.

Because the risks associated with the nearshore and the elevated-risk offshore sediments are similar, the areas are adjacent to one another, and likely remedies would be similar, these areas were considered together in developing of RAOs, and developing and evaluating remedial alternatives.

Nearshore and Elevated-Risk Offshore Sediment RAOs

In accordance with CERCLA, the RAOs developed for these areas address unacceptable COC-related risks to humans identified in the HHRA, and potential risks to aquatic organisms and avian predators identified in the marine ERA. The RAOs identified for the nearshore and elevated-risk offshore areas are presented below.

The RAO for the protection of human health:

- Prevent human ingestion of shellfish impacted by sediments with COC concentrations exceeding the selected Preliminary Remedial Goals (PRGs).

RAOs for the protection of the environment and ecological receptors:

- Prevent exposure of aquatic organisms to sediments with COC concentrations exceeding the selected PRGs.
- Prevent avian predator ingestion of shellfish impacted by sediments with COC concentrations exceeding the selected PRGs.
- Minimize migration of sediments with COC concentrations exceeding the selected PRGs to offshore areas and previously unaffected areas of Narragansett Bay.
- Prevent washout of landfill debris into the marine environment.

Offshore Sediment RAOs

The RAOs for the offshore area address the COC-related risks identified in the marine ERA. As discussed previously, the marine ERA identified potential risks to aquatic organisms associated with contaminated sediment in the offshore areas. No risks to avian predators were identified. Risks to humans are not anticipated because the depth of water makes the area inaccessible for direct contact exposures or shellfishing. RAOs identified for the offshore area are presented below.

RAOs for the protection of the environment and ecological receptors:

- Prevent exposure of aquatic organisms to sediments with COC concentrations exceeding the selected PRGs.
- Minimize migration of sediments with COC concentrations exceeding the selected PRGs to previously unaffected areas of Narragansett Bay.

Remedial alternatives that satisfy these RAOs will minimize or eliminate the human and ecological risks identified by the various risk assessments for the site.

Development of Sediment Preliminary Remediation Goals (PRGs)

State and federal hazardous waste management standards require that the landfill debris present at the site must be either removed or suitably capped to prevent washout into the marine environment. In addition, numerical PRGs were developed for contaminated sediment as part of the feasibility study. The objective of the overall PRG development process was to select COCs and corresponding concentrations that, when implemented as cleanup criteria (PRGs), would address the areas of unacceptable human health and/or ecological risk. The selected PRGs must be protective of each of the principal receptors identified at the site (humans, aquatic organisms, and avian aquatic predators) and they should be reasonable and practical to implement.

Sediment PRGs that are protective of the identified receptors were developed for the site using an approach developed by SAIC that considered both the human health and ecological risk, as well as ARARs and TBCs. The approach and results are summarized below. The complete PRG development process is presented in Appendix D of the Feasibility Study report for the site (TtNUS, 1999a).

The PRG development process considered each exposure pathway (aquatic organisms, avian predators, and human health) individually to identify PRGs for the COCs that posed the greatest risks for each type of receptor. Then a spatial analysis was used to identify the subset of COCs that could be addressed to achieve site-wide risk reduction for all receptors. This analysis concluded that implementing the recommended PRGs for six COCs (copper, nickel, anthracene, fluorene, pyrene, and total PCBs) will achieve site-wide risk reduction for all identified receptors because by remediating (removing) these six COCs to their PRG concentrations, all other COCs will be remediated to levels below their corresponding PRGs. This site wide risk reduction for all COCs will occur because the remaining COCs (including other risk contributors such as arsenic, lead, and crysene) are co-located with the six "limiting" COCs and removing the sediments exceeding the PRGs for the six "limiting" COCs will also result in the removal of the remaining COCs. The selected remediation goals for the site sediment are presented in Table 2.

TABLE 2
SELECTED REMEDIATION GOALS
MCALLISTER POINT LANDFILL MARINE SEDIMENT

Contaminant of Concern	Selected Remediation Goals (units)
Copper	52.9 (ppb in porewater)
Nickel	33.7 (ppb in porewater)
Anthracene	513 (ppb in sediment)
Fluorene	203 (ppb in sediment)
Pyrene	2,992 (ppb in sediment)
Total PCBs	3,634 (ppb in sediment)

Nine remedial alternatives were developed for addressing contamination at the two designated marine areas, including five alternatives for the nearshore and elevated-risk offshore areas, and four alternatives for the offshore areas. The two sets of alternatives were developed and evaluated because of differences in contaminant concentrations, identified risk receptors, and physical characteristics between the two regions of the site.

The description of each alternative is followed by a summary of its anticipated costs. Detailed cost estimates (including the assumptions that went in to them) can be found in Section 2.11.

Nearshore and Elevated Risk Offshore Alternatives

The nearshore/elevated-risk offshore alternatives address the contaminated sediments which pose the greatest potential risks to humans (through ingestion of contaminated shellfish) and ecological receptors. As noted in the discussion of RAOs above, the nearshore and elevated-risk offshore areas were combined for the purposes of remedial alternative development because the areas pose similar risks that would be addressed in a similar manner.

Alternative NS/ER-1: No Action

The no action alternative, as required under the NCP, would involve no remedial response activities and would provide no additional protection of human health or the environment. However, it does provide a baseline for comparison to other alternatives. Since contamination would remain and unrestricted future use of the nearshore environment would be allowed, 5-year reviews of the no action decision would be required.

Under this alternative no remedial actions would be performed, no measures would be implemented to restrict access to the marine environment adjacent to the landfill, and no actions would be taken to warn people of the hazards associated with shellfishing or wading in the area. However, measures currently in place would continue to provide limited protection of human health. Existing measures that provide some protection include a shellfishing ban in the area of the site, fencing around the McAllister Point Landfill that limits access to the shoreline from Defense Highway, and restrictions on land use and development of the McAllister Point Landfill site imposed by the source control ROD.

The only component of this alternative is:

- Five-year reviews

Estimated Time for Design and Construction: not applicable

Estimated Capital Cost: \$0

Estimated Operation and Maintenance/Long-term Monitoring Cost: \$0

Estimated 5-year Review Cost: \$21,500/5 yr

Estimated Total Cost (30-year net present worth at a 7% discount rate): \$46,000

Alternative NS/ER-2: Limited Action

The limited action alternative would involve no direct remedial response activities for contaminated marine sediment or landfill materials adjacent to the McAllister Point Landfill. It would provide no removal or treatment of contaminated material. Therefore, it would provide no protection of the environment or ecological receptors. However, it would provide some additional protection of human health by employing access restrictions (shoreline fencing and signs, and nearshore buoys) to augment the protection measures currently in place (landfill fencing, shellfishing ban, and land use restrictions). It would also include a long-term monitoring program to evaluate changing conditions at the site. Because contamination would remain, 5-year reviews of the alternative would be required to evaluate the risks to human health and the environment posed by the site in the future.

The major components of Alternative NS/ER-2 are:

- Design and installation of fencing, signs, and buoys
- Long-term monitoring
- Five-year reviews

Estimated Time for Design and Implementation: 6 months

Estimated Capital Cost: \$25,000

Estimated Operation and Maintenance/Long-term Monitoring Cost: \$94,600/yr (years 1-5 and 5-year intervals) and \$8,800/yr (remaining years)

Estimated 5-year Review Cost: \$21,500/5 yr

Estimated Total Cost (30-year net present worth at a 7% discount rate): \$656,000

Alternative NS/ER-3: Capping

Containment was considered in areas of contamination exceeding recommended PRGs and presence of landfill debris where RAOs included minimizing potential human exposure due to ingestion of impacted shellfish and contact with landfill debris, and minimizing ecological receptor exposure to contaminated sediment or biota.

Alternative NS/ER-3 would involve capping the nearshore and elevated-risk offshore area with a cover system that would prevent human or ecological receptor exposure to contaminated sediment and resist erosion due to wave action. The cap system would be designed to encourage regeneration of the aquatic habitat to pre-capping conditions. The cap would cover an estimated 6.1 acres of upland, intertidal, and subtidal land in the nearshore/elevated-risk offshore area where sediment concentrations exceed recommended PRGs. Placement of the cap would increase the grade in the capped areas 2 to 3 feet depending on cap thickness, converting approximately 1.12 acres of intertidal to upland area, and converting approximately 2.27 acres of subtidal to intertidal area. This would increase the size of intertidal zone by approximately 1.15 acres, but would result in a net loss of approximately 1.12 acres of subtidal aquatic habitat.

Long-term O&M of the cap would be required to ensure its protectiveness. Because contaminated sediments exceeding recommended PRGs would remain in place, long-term monitoring and 5-year reviews of the effectiveness of the alternative would be required.

The major components of Alternative NS/ER-3 are:

- Pre-Design investigation
- Sedimentation controls
- Subgrade preparation
- Multi-media and natural cap installation in designated areas
- Habitat Restoration/Mitigation
- Long-term O&M of capped areas
- Long-term monitoring
- Five-year reviews

Estimated Time for Design and Construction: 1.5 to 2 years

Estimated Capital Cost: \$9,131,000 to \$13,872,000 (depending on size of area to be capped)

Estimated Operation and Maintenance/Long-term Monitoring Cost: \$120,800/yr (years 1-5 and 5-year intervals) and \$35,500/yr (remaining years)

Estimated 5-year Review Cost: \$21,500/5 yr

Estimated Total Cost (30-year net present worth at a 7% discount rate): \$10,088,000 to \$14,829,000 (depending on size of area to be capped)

Alternative NS/ER-4: Capping with Dredging to Match Existing Grade

This alternative has components similar to Alternative NS/ER-3 except that areas to be capped would be excavated/dredged prior to cap placement so that the installed cap would match existing grades. The objective of Alternative NS/ER-4 is to provide containment (capping) of impacted sediment while returning the capped area to its approximate original elevation and topography to minimize potential impacts to the aquatic habitat in the capped area.

The major components of Alternative NS/ER-4 are:

- Pre-Design investigation
- Sedimentation controls
- Contaminated sediment and debris excavation/dredging to a depth of 2 to 3 feet in the area to be capped
- Excavated sediment dewatering for disposal or reuse
- Dewatering fluids treatment
- Sediment and debris disposal in new cell at McAllister Point Landfill or appropriately permitted RCRA Landfill
- Natural or multi-media cap installation in designated areas
- Habitat Restoration/Mitigation
- Long-term O&M of capped areas
- Long-term monitoring
- Five-year reviews

Estimated Time for Design and Construction: 2.5 to 3 years

Estimated Capital Cost: \$13,817,000 to \$19,408,000 (depending on size of area to be dredged and capped)

Estimated Operation and Maintenance/Long-term Monitoring Cost: \$120,800/yr (yrs 1-5 and 5-yr intervals) and \$35,500/yr (remaining years)

Estimated 5-year Review Cost: \$21,500/5 yr.

Estimated Total Cost (30-year net present worth at a 7% discount rate): \$14,775,000 to \$20,365,000
(depending on size of area to be dredged and capped)

Alternative NS/ER-5: Dredging and Disposal

This alternative was developed to provide a remedial action that reduces or eliminates the on-site toxicity, mobility, and volume of contaminated landfill materials and marine sediment through removal and disposal. Alternative NS/ER-5 includes installing a shoring system to protect the landfill cap during sediment removal, removing all landfill debris and all contaminated sediment exceeding recommended PRGs, dewatering the removed materials, treating and discharging dewatering fluids to the bay, disposing the solids in the McAllister Point Landfill and/or appropriately permitted off-base landfills, and refilling the dredged area back to the original grade. These actions would reduce potential risks to human health and the environment by removing contaminated sediment from the nearshore area and disposing them in appropriately secured facilities.

The major components of Alternative NS/ER-5 are:

- Pre-design investigation
- Sedimentation controls
- Contaminated sediment and debris excavation/dredging. Removal of all landfill debris. Removal of all contaminated sediment exceeding PRGs.
- Excavated sediment and debris dewatering and processing for disposal or reuse
- Sediment and debris disposal in new cell at McAllister Point Landfill and/or appropriately permitted RCRA Landfill
- Excavated/dredged areas backfilling with natural fill
- Habitat Restoration/Mitigation
- Dewatering fluids treatment and discharge
- Monitoring (years 1, 2, and 5 only)
- Five-year review (year 5 only)

Estimated Time for Design and Construction: 2.5 to 3 years

Estimated Capital Cost: \$17,140,000 to \$26,325,000 (depending on volume of material to be disposed)

Estimated Operation and Maintenance/Long-term Monitoring Cost: \$105,280/yr (years 1, 2 and 5 only)

Estimated 5-year Review Cost: \$21,500/5 yr

Estimated Total Cost (30-year net present worth at a 7% discount rate): \$17,420,000 to \$26,606,000
(depending on volume of material to be disposed)

Offshore Area Alternatives

The offshore alternatives were developed to address sediment contamination exceeding baseline PRGs in the subtidal zone adjacent to the McAllister Point Landfill. This area was designated by the ecological risk assessment as posing risks to marine biota due to concentrations of PAHs, pesticides/PCBs, butyltins, and metals in the marine sediments.

Alternative OS-1: No Action

The no action alternative, as required under the NCP, would involve no remedial response activities for impacted sediment in the offshore areas. However, it would provide a baseline for comparison to other offshore alternatives. Under this alternative, no remedial actions would be performed, access to marine sediments offshore of the site would not be restricted, and no direct protection of marine biota would be provided. Since sediment contamination would remain, 5-year reviews of the no action decision would be required.

The only component of Alternative OS-1 is:

- Five-year reviews

Estimated Time for Design and Construction: not applicable

Estimated Capital Cost: \$0

Estimated Operation and Maintenance/Long-term Monitoring Cost: \$0

Estimated 5-year Review Cost: \$21,500/5 yr

Estimated Total Cost (30-year net present worth at a 7% discount rate): \$46,000

Alternative OS-2: Limited Action

Alternative OS-2 is a limited action option that would provide no direct remedial response activities. No containment, removal, and/or treatment of contaminated marine sediments would be conducted, and no erosion control actions would prevent potential migration of contaminated sediment into Narragansett Bay and connecting waterways. This alternative would provide no use restrictions, since no risk to human health was identified. A long-term monitoring program and 5-year reviews would be conducted to evaluate risks to the environment posed by the site. For the purposes of costing, it was assumed that annual monitoring would be conducted for the first 5 years and then the sampling frequency would be reduced from annually to every 5 years. The actual monitoring frequency would be determined by the Navy and regulatory agencies based on the monitoring results and 5-year reviews.

The major components of Alternative OS-2 are:

- Long-term monitoring
- Five-year reviews

Estimated Time for Design and Implementation (first year monitoring): 6 months

Estimated Capital Cost: \$0

Estimated Operation and Maintenance/Long-term Monitoring Cost: \$110,200/yr (years 1-5 & at 5-year intervals thereafter)

Estimated 5-year Review Cost: \$21,500/5 yr

Estimated Total Cost (30-year net present worth at a 7% discount rate): \$657,000

Alternative OS-3: Capping

This alternative, while providing no contaminant removal or treatment, would limit potential risks to the environment by implementing engineering controls. The main component of the containment alternative would be construction of a natural cap to be placed over the impacted sediment in the designated offshore areas. The cap would cover an estimated 40.9 acres of the offshore area where sediment concentrations exceeded baseline PRGs. The cap would minimize direct environmental exposure to contaminated marine sediment; allow for the restoration of marine biota; and restrict movement and control erosion and subsequent migration of contaminated sediment into unimpacted areas of Narragansett Bay. A long-term O&M program, including annual inspections and as-needed repair, would be conducted to ensure that the cap remains in good condition and remains protective over the years. A long-term monitoring program and 5-year reviews would be conducted to evaluate potential risks to the environment posed by the site and to evaluate the effectiveness of the remedial alternative. For the purposes of costing, it was assumed that annual monitoring would be conducted for the first 5 years and then the sampling frequency would be reduced from annually to every 5 years. The actual monitoring frequency would be determined by the Navy and regulatory agencies based on the monitoring results and 5-year reviews.

The major components of Alternative OS-3 are:

- Pre-design investigation
- Sedimentation controls
- Natural cap installation
- Long-term O&M of the capped area
- Long-term monitoring

- Five-year reviews

Estimated Time for Design and Construction: 2.5 to 3 years

Estimated Capital Cost: \$14,793,000 to \$25,700,000 (depending on size of area to be capped)

Estimated Operation and Maintenance/Long-term Monitoring Cost: \$110,200/yr (years 1-5 & at 5-year intervals thereafter)

Estimated 5-year Review Cost: \$21,500/5 yr

Estimated Total Cost (30-year net present worth at a 7% discount rate): \$15,450,000 to \$26,357,000 (depending on size of area to be capped)

Alternative OS-4: Dredging and Disposal

Alternative OS-4 would involve removing contaminated sediment, dewatering the removed materials, treating discharge water, restoring disturbed habitats, and disposing the solids (estimated at between 58,000 and 79,000 cubic yards) at an approved disposal facility. Although no treatment is provided, this alternative would reduce potential risks to marine biota by removing contaminated sediment from the offshore area and disposing it in an appropriately secured landfill. This alternative would include treating and disposing dewatering liquids and restoring the marine environment impacted by the sediment removal operations. Since no contaminants exceeding the PRGs would remain on site, a long-term monitoring program and 5-year reviews would not be required. Mitigation of subtidal aquatic habitat alteration would require monitoring to evaluate the success of restoration measures.

The major components of Alternative OS-4 are:

- Pre-design investigation
- Sedimentation controls
- Contaminated sediment excavation/dredging (all sediment exceeding baseline PRGs)
- Excavated sediments dewatering for disposal
- Excavated sediment disposal in an off-site RCRA Subtitle D landfill without treatment
- Dewatering fluids treatment and discharge
- Monitoring (years 1, 2, and 5)
- Five-year review (year 5 only)

Estimated Time for Design and Construction: 2 to 2.5 years

Estimated Capital Cost: \$31,286,000 to \$56,703,000 (depending on size of area to be excavated)

Estimated Operation and Maintenance/Long-term Monitoring Cost: \$19,440/yr (years 1, 2, & 5)

Estimated 5-year Review Cost: \$0

*Estimated Total Cost (30-year net present worth at a 7% discount rate): \$31,335,000 to \$56,752,000
(depending on size of area to be excavated)*

2.10 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

The NCP provides nine criteria to evaluate each of the remedial alternatives that were analyzed in the FS for this area. These criteria are divided into three groups: threshold criteria (statutory requirements that must be met), balancing criteria (technical factors that help distinguish between different alternatives), and modifying criteria (acceptance by state officials and local residents). This section of the ROD provides a comparative analysis of the remedial alternatives relative to each of the nine selection criteria. Because the Navy has considered separate sets of alternatives for both the nearshore/elevated-risk offshore areas, and the offshore areas, the ROD will discuss each set of alternatives separately.

Threshold Criteria

Overall protection of human health and the environment

The overall protection of human health and the environment is the primary concern, and one of the statutory requirements, in remedy selection. A remedial action is protective of human health and the environment if it eliminates, reduces, or controls current and potential future exposure risks to human and ecological receptors through each applicable exposure pathway.

Comparison of Nearshore/Elevated-Risk Offshore remedial alternatives for this criterion

Because no actions would be taken under alternative NS/ER-1, this alternative would provide no additional protection of human health or the environment. Alternative NS/ER-2 would provide limited protection of human health through implementation of access restrictions to discourage use of the site for shellfishing, but would provide no protection to aquatic animals or plants.

Alternative NS/ER-3 would provide protection of both human health and the environment by containing (isolating) the contaminated marine sediment and landfill debris beneath a constructed cap. For this protection to last, the cap must be designed, constructed, and maintained to withstand the severe coastal storms that can be expected at this site. Alternative NS/ER-4 would provide similar overall protection to NS/ER-3, except that approximately 22,000 cubic yards of contaminated sediments would be dredged and disposed in a secured landfill, resulting in a smaller area and volume of contaminated sediments remaining

in the NS/ER area. If the caps were to fail, NS/ER-4 would provide greater reduction in risk by permanently removing a large volume of contaminants from the bay. It may be somewhat easier to ensure the long-term integrity of the capped area under NS/ER-4, because it would be somewhat smaller than under NS/ER-3; however, the difference is not expected to be significant.

Alternative NS/ER-5 would provide greater overall protection of human health and the environment than any of the other alternatives because contaminants would be permanently removed from the bay. The removal of all of the highly contaminated NS/ER sediments also ensures that this remedial alternative would be effective over time, and would eliminate the need for long-term Operation & Maintenance (O&M).

Comparison of Offshore Remedial Alternatives for this Criterion

The no action (OS-1) alternative would provide no additional protection of ecological receptors (no human health receptors were determined to be associated with offshore contamination). Alternative OS-2 would be somewhat more protective than OS-1 because long-term monitoring and 5-year reviews would provide a means to evaluate changes in contaminant concentrations and any associated changes in ecological risks.

Alternative OS-3 would provide protection to the environment by containing the contaminated marine sediment, assuming its cap could be designed, constructed, and maintained to withstand the impacts of tides and weather. Alternative OS-4 would prevent potential risks to the environment through contaminant removal. Short-term impacts of this alternative would be somewhat greater than those of OS-3 because of the large amount of dredging involved.

Alternatives OS-3 and OS-4 may actually provide less overall protection of the environment than the other alternatives because the impacts of the remedial actions may be greater than the reductions in contaminant-related risk. Both OS-3 and OS-4 would result in the permanent destruction of eelgrass beds offshore of the landfill. Mitigation for this loss would be difficult. Additionally, the remedial actions taken under Alternatives OS-3 and OS-4 would likely result in excessive sediment resuspension, which may increase the area impacted by contaminated sediment and damage sensitive aquatic receptors. For these reasons, Alternatives OS-3 and OS-4 are considered more damaging to the environment in the short and long term than OS-1 and OS-2.

Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those substantive environmental protection or facility siting requirements, criteria, or limitations promulgated under Federal or State law that specifically address hazardous substances, the remedial action to be implemented at the site, the location of the site, or other circumstances present at the site. Relevant and appropriate requirements are those substantive environmental protection or facility siting requirements, criteria, or limitations promulgated under Federal or State law which, while not applicable to the hazardous materials found at the site, the remedial action itself, the site location, or other circumstances at the site, nevertheless address problems or situations sufficiently similar to those encountered at the site that their use is well-suited to the site.

This criterion addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements or provide a basis for invoking a waiver of specific ARARs.

Comparison of Nearshore/Elevated-Risk Offshore Remedial Alternatives for this Criterion

Alternatives NS/ER-1 and NS/ER-2 fail to meet chemical-specific ARARs (water quality standards) used to derive sediment PRGs. Alternatives NS/ER-3 and NS/ER-4 would comply with federal and state chemical-specific ARARs used to derive sediment PRGs as long as the proposed cap prevents exposure to sediments exceeding the PRGs, and contaminants from these sediments do not migrate through the cap. Alternative NS/ER-5 would comply with federal and state chemical-specific ARARs used to derive sediment PRGs because sediments exceeding the PRGs would be removed by dredging.

There are no location-specific or action-specific ARARs for Alternative NS/ER-1. Alternative NS/ER-2 does not satisfy federal location-specific ARARs for the protection of wetlands and floodplains, or state hazardous waste standards for facilities within a floodplain.

Alternative NS/ER-3 would cause the permanent loss of some intertidal habitat as a result of construction of its cap, and this would have to be mitigated by creation or restoration of aquatic habitat off site to comply with the Clean Water Act (CWA) Section 404. NS/ER-3 could only be selected if there were no practicable alternative that had less effect on aquatic resources. Alternative NS/ER-4 would not result in permanent habitat loss because it requires sediment excavation to ensure that the cap will leave site

topography unchanged. Alternatives NS/ER-3 and NS/ER-4 can only satisfy state and federal location standards for hazardous waste facilities if their caps can be constructed and maintained to withstand a 100-year storm event. It is unclear from existing information whether an underwater cap meeting this standard could be built. Aquatic habitat damaged in the construction of NS/ER-4 and NS/ER-3 would have to be restored to comply with CWA Section 404 standards. If these conditions were met, Alternatives NS/ER-3 and NS/ER-4 would meet all state and federal location-specific ARARs. In addition, NS/ER-3 and NS/ER-4 would meet all state and federal action-specific ARARs.

Alternative NS/ER-5 would meet all state and federal location-specific ARARs and all state and federal action-specific ARARs if it were properly implemented. To satisfy the CWA Section 404 requirements, damaged aquatic habitats would have to be restored, but NS/ER-5 is not expected to cause any permanent habitat losses.

Comparison of Offshore remedial alternatives for this criterion

Alternatives OS-1 and OS-2 would meet chemical-specific ARARs (state and federal water quality criteria) only if sediments in the offshore area do not exceed the recommended PRGs derived from these standards. Limited data indicate that these areas do not exceed the recommended PRGs, but additional monitoring is needed to ensure compliance. Alternative OS-1 does not include monitoring, while OS-2 does.

Alternative OS-1 does not have any state or federal location-specific or action-specific ARARs. Alternative OS-2 would meet all location-specific and action-specific ARARs by conducting monitoring activities in accordance with the identified regulations and coordinating with appropriate agencies to find ways to minimize adverse effects to fish, wildlife, and endangered species from monitoring activities.

Alternative OS-3 would comply with federal and state chemical- and action-specific ARARs (water quality standards) if the proposed cap can be designed, constructed, and maintained to contain contaminants and protect the environment. Alternative OS-4 would comply with chemical- and action-specific ARARs.

Alternatives OS-3 and OS-4 would meet all state and federal location-specific ARARs by conducting activities in accordance with applicable regulations and coordinating with appropriate agencies. However, both alternatives would destroy the eelgrass beds offshore of the landfill. Because restoration of the destroyed eelgrass beds may not be possible, it may be necessary to modify the alternatives to avoid impacting the eelgrass beds or conduct off-site or out-of-kind mitigation measures. For either of these alternatives to be selected, it would have to be the least damaging practicable alternative.

Balancing Criteria

Long-term Effectiveness and Permanence

Long term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk and the adequacy and reliability of proposed physical and institutional controls.

Comparison of Nearshore/Elevated-Risk Offshore Remedial Alternatives for this Criterion

Alternative NS/ER-1 would provide no additional long-term effectiveness or permanence in addressing sediment contamination at the site. Properly enforced, Alternative NS/ER-2 would be somewhat effective at minimizing human health risks by discouraging/deterring site access. It would not be effective in limiting any potentially adverse environmental impacts or potential migration of contamination. Alternatives NS/ER-3 and NS/ER-4 would provide a higher level of long-term effectiveness than would NS/ER-2 by preventing direct contact with contaminated sediment through containment/capping. As mentioned above, the containment alternatives can only be effective if the caps can be designed, constructed, and maintained to withstand a 100-year storm event. Because Alternative NS/ER-4 would decrease the area and volume of contaminated sediments remaining, long-term risks are expected to be lower than for capping alone (Alternative NS/ER-3).

Alternative NS/ER-5 would be the most effective alternative in eliminating long-term risks to human health and the environment because it removes most of the contaminated media from the marine environment. Because some contaminated sediment would remain beneath the landfill revetment, this alternative assumes that monitoring would be conducted to ensure the effectiveness of the remedy. A review would be conducted to assess whether additional actions or continued monitoring are necessary, further ensuring an effective, permanent solution.

Comparison of Offshore Remedial Alternatives for this Criterion

Alternative OS-1 would provide no long-term effectiveness and permanence in addressing sediment contamination at the site. Alternative OS-2 would provide limited long-term effectiveness and permanence by monitoring changes in site conditions and risks, and assessing whether the changes dictate the need for further remedial actions. Alternative OS-3 would provide a higher level of long-term effectiveness than would OS-1 and OS-2, provided that the proposed cap can be designed, constructed, and maintained to

withstand washing out within a dynamic marine environment. No information is available to determine whether the containment alternative would be effective in the long term. Alternative OS-4 would provide a higher level of long-term effectiveness than the other three offshore alternatives. By removing the contaminated sediment from the marine environment, Alternative OS-4 would permanently eliminate long-term risks to the marine biota due to direct contact with contaminated sediment. Disposal of contaminated sediment at an off-site landfill would eliminate the need for long-term management and monitoring of untreated sediments or residuals on site (which would be required under the other OS alternatives).

Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion refers to the anticipated performance of any treatment technologies that are included as part of the proposed remedy.

Comparison of Nearshore/Elevated-Risk Offshore Remedial Alternatives for this Criterion

Alternatives NS/ER-1, NS/ER-2, NS/ER-3, and NS/ER-4 would not provide any reduction of toxicity, mobility, or volume through treatment. Alternative NS/ER-5 would reduce the toxicity and mobility through treatment of a small fraction (approximately 9 percent) of the contaminated sediment that is disposed off site (approximately 1 percent of total dredged volume). The overall volume of contaminated sediment would not be reduced, and may actually be increased by treatment under Alternative NS/ER-5 due to bulking associated with stabilization treatment before landfilling.

Comparison of Offshore remedial alternatives for this criterion

None of the alternatives would provide reduction of toxicity, mobility, or volume through treatment.

Short-term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to the workers, the community, and the environment during construction and operation of the remedy until cleanup goals are achieved.

Comparison of Nearshore/Elevated-Risk Offshore remedial alternatives for this criterion

The no action alternative would not change short-term risks and would never achieve RAOs at the site. For Alternative NS/ER-2, which would take about 1 month to implement, a minimal increase in short-term

risks would result because of disturbances to subsurface conditions during fencing, buoy system installation, and monitoring activities. Human health RAOs would be achieved but environmental RAOs would not.

Alternatives NS/ER-3, NS/ER-4 and NS/ER-5 would all temporarily eliminate intertidal and subtidal aquatic habitat during dredging and filling. For each of these action alternatives it would take approximately 1-4 years from the completion of construction activities for the natural aquatic community to be re-established. Alternatives NS/ER-3, NS/ER-4 and NS/ER-5 would all potentially result in increases in short-term risks due to disruption and suspension of contaminated sediment during site preparation, dredging (NS/ER-4 and NS/ER-5), and cap construction (NS/ER-3 and NS/ER-4) activities. These risks would increase as the volume of contaminated sediment suspended increases, but measures to reduce or contain sediment suspension could be used to minimize these risks. Dredging (NS/ER-4 and NS/ER-5) could also increase risks to workers (from contact with contaminated media and landfill debris). These risks could be minimized by using personal protective equipment.

NS/ER-3 would take less time to meet RAOs - approximately 10 months of cap construction- and disrupt less sediment than NS/ER-4, which would take approximately 20 months to meet RAOs (dredging, capping, disposing sediment and debris). Dredging and backfilling for NS/ER-5 would potentially disrupt the most contaminated sediment and create the greatest short-term environmental risk. RAOs under this alternative would take approximately 23 months to attain (dredging, backfill, disposing sediment and debris). Additional environmental risks may result from NS/ER-5 if the integrity of the McAllister Point Landfill were compromised during removal activities at the toe of the landfill. Extensive shoring may be required in the central portion of the landfill shoreline to protect the landfill cap and prevent these risks.

Comparison of Offshore remedial alternatives for this criterion

The no action (OS-1) alternative would not change short-term risks at the site. It is uncertain when or if RAOs would be achieved under this alternative. Alternative OS-2 would result in slight short-term risks to workers from monitoring activities - risks that could be minimized by using protective equipment. Monitoring efforts included in OS-2 would help determine if or when RAOs were achieved.

Alternative OS-3 could increase short-term risks by disrupting and suspending contaminated sediment. Measures to minimize and/or contain sediment suspension would reduce short-term risks to the marine environment by limiting discharge to offshore waters, while protective equipment would protect workers. Alternative OS-3 would take about 21 months to meet RAOs. Alternative OS-4 would result in somewhat greater short-term impacts (due to the larger amount of dredging) and the same degree of long-term

impacts to the environment as OS-3. OS-4 would meet RAOs in about 14 months. Both OS-3 and OS-4 could destroy eelgrass beds offshore of the landfill, a loss that would be difficult to mitigate except through off-site or out-of-kind mitigation.

Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are considered under this criterion.

Comparison of Nearshore/Elevated-Risk Offshore remedial alternatives for this criterion

The no action alternative is the most readily implementable. It would require no construction activities. Limited actions associated with Alternative NS/ER-2 would also be readily implemented. The most cumbersome component in implementing NS/ER-2 is providing continual enforcement of the access and use restrictions on state-owned land. Continued maintenance of the fencing and buoy system would be required to ensure protection of human health. Implementation would not limit conducting future remedial actions at the site, if deemed necessary.

Implementation of Alternatives NS/ER-3, NS/ER-4, and NS/ER-5 would require significant efforts, both technically and administratively. Implementation is complex because of the location of the area to be dredged (NS/ER-4 and NS/ER-5) and capped (NS/ER-3 and NS/ER-4) in the intertidal zone adjacent to the landfill. For NS/ER-3 and NS/ER-4, the performance standards the cap must meet (the cap must be designed, constructed, and maintained to withstand a 100-year storm within a high energy coastline) also increase the difficulty of implementation. As noted above, NS/ER-3 would also result in the permanent loss of aquatic habitat, and would require mitigation measures that may be difficult to implement, such as the creation of new intertidal habitat off site. Although it does not require the construction of an underwater cap, Alternative NS/ER-5's deep sediment excavation near the landfill may require the installation of a substantial shoring system in the central portion of the landfill shoreline to protect the existing landfill cap. For all of these alternatives, implementation is further complicated by difficult land-based site access. Water-based access may also be difficult, as some areas may be too shallow for barge access but too deep for a temporary cofferdam to effectively hold back water. Site preparation, dredging, capping, and shoring-system construction would all be affected by these access limitations.

Comparison of Offshore remedial alternatives for this criterion

Both the no action (OS-1) and limited action (OS-2) alternatives are readily implementable. They would require no construction activities. Both Alternative OS-3 and Alternative OS-4 would require coordination and agreement with regulatory agencies regarding marine dredging and filling operations and potential effects on fisheries, endangered species, aquatic habitat, and historical and coastal resources. As noted above, mitigation measures for the inevitable destruction of eelgrass habitat that would result from pursuing Alternative OS-3 or OS-4 would be difficult to implement.

The implementation of Alternative OS-3 would also be difficult because of 1) the location of the contaminated marine sediment to be contained/capped, and 2) the performance standards the cap must meet (it must be designed, constructed, and maintained to withstand washing out within the dynamic marine environment of the bay). Alternative OS-4 may be somewhat harder to implement than OS-3 because of the likely difficulty in finding adequate disposal capacity for the large volume of sediments that would be removed.

Cost

This criterion evaluates the capital, annual operations and maintenance (O&M), and present worth costs for each alternative, and includes a cost sensitivity analysis that illustrates how the cost would change if the volume of contaminated materials that require removal is greater or less than the estimated volume. Present worth costs were developed for a 30 year period at a 7 percent discount rate.

Comparison of Near-Shore/Elevated-Risk Offshore Remedial Alternatives for this Criterion

Costs	Alt. NS/ER-1: No Action	Alt. NS/ER-2: Limited Action	Alt. NS/ER-3: Capping	Alt. NS/ER-4: Capping with Dredging	Alt. NS/ER-5: Dredging and Disposal
Capital (\$)	0	\$25,000	\$11,976,000	\$17,172,000	\$22,339,000
O&M and Monitoring (\$/yr)	0	\$94,600 (yrs 1-5) and 5-yr intervals \$8,800 (yrs 6-30)	\$120,800 (yrs 1-5) and 5-yr intervals \$35,000 (rem. yrs)	\$120,800 (yrs 1-5) and 5-yr intervals \$35,000 (rem. yrs)	\$105,300 (yrs 1, 2, & 5)
5-Year Reviews	\$21,500/ 5 yr	\$21,500/5 yr	\$21,500/5 yr	\$21,500/5 yr	\$21,500/5 yr (Year 5 Only)
NET PRESENT WORTH	\$46,000	\$656,000	\$12,933,000	\$18,129,000	\$22,619,000
SENSITIVITY ANALYSIS					
Net Present Worth: +20% Vol.	No Change	No Change	\$14,829,000	\$20,365,000	\$26,606,000
Net Present Worth: -30% Vol.	No Change	No Change	\$10,088,000	\$14,775,000	\$17,420,000

Comparison of Offshore Remedial Alternatives for this Criterion

Costs	Alternative OS-1: No Action	Alternative OS-2: Limited Action	Alternative OS-3: Capping	Alternative OS-4: Dredging and Disposal
Capital (\$)	0	0	\$20,246,000	\$43,994,000
O&M (\$/yr)	\$21,500/5 yr	\$110,200 (yrs 1-5 and 5-yr intervals)	\$110,200 (yrs 1-5 and 5-yr intervals)	\$19,440 (yrs 1, 2, and 5)
Five Year Reviews	\$21,500/5 yr	\$21,500/5 yr	\$21,500/5 yr	0
NET PRESENT WORTH (\$)	\$46,000	\$657,000	\$20,904,000	\$44,043,000
SENSITIVITY ANALYSIS				
Net Present Worth (\$): + 30% Vol.	No Change	No Change	\$26,357,000	\$56,752,000
Net Present Worth (\$): -30% Vol.	No Change	No Change	\$15,450,000	\$31,335,000

The Navy is planning the release of funds so that the project will not have to be phased due to funding constraints. However, weather conditions or other factors may require that the project be conducted in more than one mobilization. If it appears based on the results of the pre-design investigation that the project will have to be phased, a revised cost estimate will be completed to reflect the anticipated construction schedule.

Modifying Criteria

State/Support Agency Acceptance

This criterion evaluates whether state agencies (in this case, the RIDEM) agree with the proposed alternatives.

Comparison of Nearshore/Elevated-Risk Offshore Remedial Alternatives for this Criterion

RIDEM has expressed its support for NS/ER-5 (see RIDEM's concurrence letter in Appendix A). RIDEM does not believe that the remaining alternatives are acceptable because they would all leave contaminated sediments and landfill materials in the bay.

Comparison of Offshore Remedial Alternatives for this Criterion

RIDEM has expressed its support for OS-2 (see RIDEM's concurrence letter in Appendix A).

Community Acceptance

This criterion documents the approval, objections, suggestions, or modifications that the public offered to the Navy during the comment period on the proposed plan for this site.

Comparison of Nearshore/Elevated-Risk Offshore Remedial Alternatives for this Criterion

During public comment periods and meetings, the community has expressed its support for conducting a remedial action in the nearshore and elevated-risk offshore areas to reduce risks to humans and the environment, but one community group has questioned whether the selected remedy is the best proposal for expenditure of the limited funds available for cleanup at NAVSTA Newport. Public comments (and the Navy's responses) are summarized in Section 3 and included in Appendix B.

In written comments on the Proposed Plan, the Aquidneck Island Citizen's Advisory Board (AICAB) questioned whether the selected remedy is the best proposal for expenditure of the available funds for cleanup at NAVSTA Newport. AICAB has also requested that McAllister Point Landfill not be used for disposal of dredged materials and that the Navy coordinate with appropriate agencies (such as the Rhode Island Coastal Resources Management Council [CRMC]) in order to make use of "clean" fill from navigational dredging projects as backfill for dredged areas.

The CRMC also submitted a written comment requesting that the Navy consider using dredged material from Rhode Island marinas to backfill the dredged areas.

Comparison of Offshore Remedial Alternatives for this Criterion

The only feedback received on the proposed remedy for the offshore area was from AICAB. In written comments on the Proposed Plan, AICAB states that no remedial action is needed in the offshore area because the contaminant levels reported in the offshore area are below the recommended cleanup levels (PRGs). AICAB recommends that during and after the nearshore cleanup is complete, some monitoring be performed in the areas adjacent to the nearshore to assess migration from the nearshore areas. This monitoring would be conducted as part of the monitoring of the nearshore remedial action. AICAB states that the "No Action" alternative (OS-1) appears to be appropriate for the offshore areas.

This section provides a detailed description of the selected remedy, a summary of the estimated remedy costs, and a discussion of the expected outcomes of the remedial action.

Selected Remedy for the Nearshore/Elevated Risk Offshore areas

The Selected Remedy for the nearshore/elevated-risk offshore area is alternative NS/ER-5, Dredging and Disposal. This alternative envisions installing a shoring system to protect the landfill cap during sediment removal, removing all landfill debris and all contaminated sediment exceeding recommended PRGs, dewatering the removed materials, treating and discharging dewatering fluids to the bay, disposing the solids in the McAllister Point Landfill and appropriately permitted off-base landfills, and refilling the dredged area back to the original grade. To implement this remedy, the following activities would be required:

Pre-Design Investigation

A Pre-Design Investigation (PDI) would be performed to gather information needed to complete the final remedial design. The PDI would include a series of soil borings, and sediment and elutriate samples to confirm the nature and extent of contamination and determine the treatment requirements for fluids to be generated during dredging and dewatering. Approximately 35 soil borings would be needed to confirm the extent of sediment contamination and define the area for sediment removal. Borings would also be used to gather geotechnical information needed to select the dredging methods best suited for the materials present and determine the type and amount of shoring needed to ensure the stability of the landfill during dredging close to the revetment. The PDI would also include a detailed evaluation of the McAllister Point Landfill as a potential site for disposal of contaminated sediment.

Sedimentation Controls

Engineering controls would be installed around the perimeter of the area to be excavated/dredged to minimize sediment migration. A floating silt curtain, temporary coffer dam, or other appropriate particulate resuspension/turbidity control features would be placed around the perimeter of the construction area during implementation of this alternative. This would help minimize potential adverse environmental effects associated with sediment suspension.

Contaminated Sediment and Debris Excavation/Dredging of all Sediment Exceeding PRGs

Removal activities are anticipated to include both land-based excavation and barge-based mechanical dredging. Land-based excavation would be performed in the "south depositional area" using conventional earth-moving equipment such as track-mounted excavators, front-end loaders, bulldozers, and dump trucks. A portable cofferdam would be constructed along the outer limit of the work area and dewatering pumps would operate continuously to allow excavation to proceed in relatively dry conditions. (Water pumped from the work area would be treated as necessary to meet applicable discharge standards.) The remaining areas would be dredged using barge-mounted mechanical dredging equipment that could include clamshell dredges, orange-peel dredges, dipper-dredges, or excavators.

As part of the dredging operation, it will be necessary to protect portions of the McAllister Point Landfill from the effects of sediment excavation. Alternative NS/ER-5 would include relatively deep excavation of sediment near the toe of the landfill revetment. Extensive sheeting and shoring may be required to enable deep excavation near the revetment. Based on review of the as-built drawings for the landfill cap, the existing revetment extends to an average depth of approximately 4 to 6 feet below grade. Previous soil borings, which were advanced near the toe of this revetment, indicated landfill materials were present at depths below the lower limit of the revetment at many locations, with landfill materials extending to a depth of as much as 15 feet below grade near the center of the landfill shoreline. In order to remove contaminated sediment and debris below the lower limit of the revetment, sheeting and shoring will likely be required to protect against potential slope failure.

Due to the shallow depth to bedrock and the potential presence of landfill debris (submarine netting, concrete rubble, boulders, etc.) in the subgrade adjacent to the revetment (which would interfere with placement of sheetpile), it may not be possible to stabilize and protect the revetment and landfill cap using standard sheetpile alone. For the purposes of costing it was assumed that the shoring system would consist of H-pile/ soldier beams drilled 10 to 20 feet into the existing bedrock on 5-foot centers and cross braced with steel walers. The sheeting would be driven prior to dredging or, in the event refusal was encountered prior to the desired depth, the sheeting would be installed as the excavation/dredging of the contaminated sediment progresses. The sheeting would be removed after the contaminated sediments were removed and the areas were backfilled, and the H-piles would be cut flush to grade. Due to difficult access to the area, the feasibility and potential designs of the shoring system would need to be thoroughly investigated during the remedial design.

Excavated Sediment and Debris Dewatering and Processing for Disposal or Reuse/Treatment and Discharge of Dewatering Fluids

Materials excavated by land-based methods would be transported over land to Coddington Cove for staging and processing. Dredged materials would be dewatered on an offshore barge and then transported to Pier 1 for final processing and staging. Water generated from sediment dewatering would be treated to meet applicable standards and then be discharged to the bay.

An estimated 34,000 cubic yards of landfill debris and contaminated sediment would be excavated as part of Alternative NS/ER-5. The sediment would be screened/degritted to remove any trash or debris. Excavated/dredged sediment would be screened to remove debris and stones over approximately 6 inches in diameter. The screened material would be segregated as follows:

- For the purposes of this ROD, it was assumed that approximately 20 percent of the dredged material (6,800 cubic yards) would be over 6 inches in diameter and would be suitable for reuse after decontamination by methods permitted under relevant hazardous waste standards. These large rocks and boulders would be decontaminated to remove any contaminated sediments, and staged for reuse as revetment stone, wave breaks, or backfill.
- Screened material less than or equal to 6 inches in diameter (27,000 cubic yards or 80 percent of the excavated material) would be staged separately for disposal. All trash and debris such as steel, concrete, submarine netting, etc. (estimated at 500 tons) would be included with this portion of the excavated material, regardless of size. Any large debris to be sent off site for recycling or disposal would first be decontaminated to remove any contaminated sediments. Water generated from rock and debris decontamination would be treated to meet applicable standards and then discharged to the bay.

Sediment and solids would be collected and transferred to a land-based staging area at Pier 1. At this staging area, further processing of the solids would be accomplished, if necessary for disposal. Free liquid would be removed from the sediment through gravity drainage and the addition of drying agents such as lime or cement, since landfill facilities are prohibited from accepting materials that contain excess free liquid. Water from the dewatering process would be treated to meet applicable state and federal discharge standards. These activities would be conducted within a defined drainage and mixing location at Coddington Cove.

Sediment and Debris Disposal in McAllister Point Landfill, RCRA Subtitle D Landfill (with and/or without treatment), and RCRA Subtitle C Landfill

Stabilized sediment samples would be collected and analyzed to verify that the material meets land disposal criteria prior to disposal. Analyses for off-site disposal would include those associated with RCRA hazardous waste determinations (toxic characteristic leaching procedure (TCLP), ignitability, corrosivity, and reactivity), as well as those related to federal land ban requirements.

Evaluation of the existing analytical data indicates that sediment contaminant levels are low enough that the material would likely meet requirements for disposal in a RCRA Subtitle D landfill without treatment. However, due to uncertainties in the characterization of the nature and extent of sediment contamination, this ROD assumes that approximately 10 percent of the material would need treatment prior to off-base disposal or would require disposal in a RCRA C facility.

A preliminary evaluation of the McAllister Point Landfill indicates that there may be sufficient volume available within the landfill to accept approximately 21,000 to 26,000 cubic yards (approximately 78 to 96 percent) of the sediments to be disposed under Alternative NS/ER-5. The final determination of whether to dispose the sediments at the McAllister Point Landfill or transport them off site for disposal at RCRA landfills will be made during the PDI, considering the off-site disposal costs at the time, the technical feasibility of expanding the landfill, and community concerns regarding re-opening and expanding the landfill.

For the purposes of this ROD, it was assumed that the excavated/dewatered sediment would be placed in the existing McAllister Point Landfill (which meets RCRA Subtitle C standards) for final disposal until no further capacity is available, and the remaining materials would be disposed off base at an appropriate facility. Due to the large expected volume of contaminated sediment requiring disposal, the use of McAllister Point Landfill as well as one or more off-site facilities would likely be required. The plan for disposal of contaminated sediments is outlined as follows:

- Disposal of the majority of contaminated sediment and debris on site at the McAllister Point landfill until there is no further capacity available. For costing purposes, it was assumed that McAllister Point Landfill has an available capacity of approximately 21,000 cubic yards. Effort would be made to dispose any sediment identified as hazardous waste in the McAllister Point Landfill; however, some sediments determined to be hazardous after the landfill capacity has been reached may require off-site disposal.

- Disposal of the remaining sediment and debris off site (6,000 cubic yards) with the following assumptions:

Ninety percent of the sediment and debris disposed off site (5400 cubic yards) would be placed in a RCRA Subtitle D landfill without treatment. (All large debris - an estimated 500 tons - would be decontaminated by pressure washing before being disposed in a RCRA Subtitle D landfill or recycled.)

Nine percent of the sediment and debris disposed off site (540 cubic yards) would require stabilization (addition of cement or other chemical binding agents) due to elevated metals concentrations, prior to disposal in a RCRA Subtitle D landfill.

One percent of the sediment and debris disposed off site (60 cubic yards) would require disposal at a RCRA Subtitle C landfill due to elevated concentrations of organic contaminants.

Excavated/Dredged Areas Backfilled with Natural Fill

Following dredging operations, excavated areas would be backfilled with clean fill materials to match existing grades (as verified by surveying). The backfill materials would be carefully selected and placed to assist in the natural restoration of the hard-bottom aquatic community destroyed by dredging. The proposed dredging and backfilling would remove and replace approximately 6 acres of existing rocky intertidal and subtidal aquatic habitat, temporarily destroying the hard-bottom aquatic community in the area. The proposed backfill would promote the natural restoration of the affected aquatic community by providing an optimal habitat structure to support a diverse and stable aquatic community. Natural recolonization of the area would occur as water-borne algae spores and animal larvae are swept into the area by tidal currents and wave action. The long-term O&M program would include regular inspection of the backfilled areas to assess the condition of the habitat. It is anticipated that the ecological community would be reestablished within 1 to 4 years. Based on existing data, it does not appear that any eelgrass beds would be significantly impacted by implementation of NS/ER-5. If eelgrass beds are impacted, active restoration measures would be taken if passive restoration is not successful.

Monitoring

Limited monitoring will be necessary under this alternative. Although this alternative calls for complete removal of contaminated sediment exceeding selected PRGs, a small amount of sediment would likely remain in the nearshore area due to the natural limitations of dredging in a marine environment with shallow bedrock. Additionally, contaminated sediment and landfill materials would remain under the

existing revetment, between the removed nearshore sediment and the landfill cap. Because the dredged areas would be backfilled with clean fill to match the existing grades, any remaining contaminated sediments would be covered with at least 2 to 3 feet of clean fill materials. As a result, they are not expected to be available for exposure to humans or marine biota. Monitoring will determine the effectiveness of the remedial action and ensure that PRGs are not exceeded in the top portion of the fill that could be accessed by humans or marine animals.

For the ROD, it was assumed that long-term monitoring would include sediment, pore water, and biota chemistry as well as amphipod and arabacia toxicity during the first 5 years after the remedial action is completed. Since nearly all of the contaminated sediment exceeding recommended PRGs would be removed as part of this alternative and any remaining contaminated sediment would be covered by clean fill, it was assumed that sampling would be conducted only in the first 5 years and only one 5-year review would be conducted. The specific details of the long-term monitoring plan, including media to be sampled, analytical methods, sampling locations, sampling methods, and sampling frequency, will be developed by the Navy during remedial design, with input from EPA and RIDEM.

Five Year Reviews

Statutory reviews are required within five years of the initiation of the first remedial action at a site if any hazardous substances, pollutants, or contaminants remain on site. The 5-year reviews could be terminated based on regulatory agency approval provided that the monitoring data indicate that the remedy remains protective and that there is no unacceptable risk to human health or the environment. The 5-year reviews associated with the source control ROD (groundwater and landfill gas monitoring) will continue until a determination is made that no unacceptable risk to human health or the environment exists.

Selected Remedy for the Offshore Areas

The selected remedy for the offshore is OS-2: Limited Action. The limited action alternative would involve no direct remedial response activities for contaminated marine sediment offshore of the McAllister Point Landfill. No institutional controls or access restrictions would prohibit use of the area. However, this alternative would provide a long-term monitoring program to allow evaluation of changing conditions at the site. Since sediment contamination would remain, 5-year reviews of the alternative would be required to evaluate the risks to the marine environment posed by the site in its existing condition. Implementing this remedy requires the following activities:

Long-term Monitoring

The long-term monitoring program would assess changes in the marine environment over at least a 30-year period. It would include sediment, biota, and pore water chemistry as well as amphipod and arabacia toxicity. For costing purposes, it was assumed that samples would be collected from 16 locations in the offshore area. The proposed analyses would include sediment chemistry (PCBs, PAHs, metals, TOC, and SEM/AVS); biota chemistry (PCBs, PAHs, metals); and amphipod and arabacia toxicity.

Given the nature of sediment contamination and the slow changes in sediment quality anticipated, a single sampling event per year was assumed to be sufficient to monitor long-term sediment quality trends. Monitoring would be conducted on an annual basis until it was determined by the Navy and regulatory agencies that the sampling frequency could be safely reduced. For the purposes of costing, it was assumed that annual monitoring would be conducted for the first 5 years and then, assuming that the sediment quality does not decrease significantly, the long-term sampling frequency would be reduced from annually to every 5 years. The specific details of the long-term monitoring plan, including media to be sampled, analytical methods, sampling locations, sampling methods, and sampling frequency, will be developed by the Navy during remedial design, with input from EPA and RIDEM.

Five-year Reviews

The results of the monitoring would be compiled and an evaluation of the contamination and its associated risks would be conducted every 5 years, as required by CERCLA. The results of these 5-year reviews would be used to identify any changes in the contaminant concentrations and to determine the need to implement future response actions at the site or change the required frequency of long-term monitoring events. This monitoring would supplement the groundwater and landfill gas monitoring being conducted as a component of the long-term O&M activities for the McAllister Point Landfill cap.

Summary of the Estimated Remedy Costs

The estimated costs of Alternatives NS/ER-5 and OS-2, the Selected Remedy, are itemized in the following assumptions sheets and tables.

COSTING ASSUMPTIONS
ALTERNATIVE NS/ER-5: DREDGING AND DISPOSAL

CAPITAL COST ITEMS:

1. Pre-Design Investigation

- Soil borings/cores to further determine the grain size and nature of the sediments and to delineate lateral extent of contaminants exceeding the PRGs. Assume 35 soil borings at average 5-foot depth with associate analytical costs for PCBs, PAHs, Metals and geotechnical testing. Mob./demob. @ \$13,500. Sample collection @ \$600 each or \$21,000. Analytical @ \$1,350/sample for 41 samples including QA/QC samples or \$55,350. Data validation \$8,200. Reporting @ \$4,500. Oversight and management @ \$9,500. Total costs = \$112,050.
- This alternative requires the removal of all contaminated sediments. Consequently, sediments along approximately 600 feet of shoreline will be removed to depths exceeding the lower limits of the existing landfill toe revetment and the water table. This is likely to cause undermining of the revetment, which when combined with the existing hydrostatic pressures, is expected to cause slope failure. As a result, an investigation will be performed to evaluate slope stability concerns and to design a slope retention system (i.e. sheeting, shoring, etc.) that will allow removal of the contaminated sediments without jeopardizing the integrity of the existing landfill cap. the investigation will also determine if there is an environmental or engineering benefit to leaving the retention system in-place (only below the water line) such as long-term wash-out protection of the landfill toe or minimizing migration of contaminated sediments or groundwater. The estimated cost for the investigation is: 14 borings extending 20 feet into bedrock @ \$4,000/boring including geologist oversight or \$42,000. Fourteen samples will be collected and analyzed for geotechnical parameters @ \$100/sample. The data will be evaluated and a slope stability design will be generated cost is estimated at \$45,000. The total cost for this investigation is estimated at \$88,400.

2. Mobilization/Demobilization includes providing office trailers, temporary utilities and sanitary facilities, delivery and removal of major construction equipment, and providing all other facilities and materials needed by the management staff.
3. It is assumed that no subgrade preparation will be required prior to dredging the contaminated sediments. Large metal and concrete debris will be removed from the sediments after they have been dredged, but prior to dewatering.
4. Erosion controls will be provided to reduce migration of sediments during the dredging operations by means of a silt boom. The silt boom will be anchored around the perimeter of the dredge area.
5. Removal of contaminated sediments (34,115 cuyd) will be accomplished through a combination of a shore-based excavation operation and a barge-based dredging operation. All work performed in the southern depositional (shallow) areas (approximately 11,182 cuyd) will be performed from the land using a portable cofferdam, dewatering pumps, and hydraulic excavation equipment. All other work in the remaining areas (approximately 22,933 cuyd) will be performed by barge-based crane and dredge equipment.

COSTING ASSUMPTIONS
ALTERNATIVE NS/ER-5: DREDGING AND DISPOSAL
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- It is assumed that the dredging and cap construction activities will not be subject to ecological restrictions that would limit the dredging season because of the presence of a sensitive species that could be adversely affected by remedial actions. It is assumed all dredging/construction work will occur within one mobilization period.
- Six-inch and smaller material will be screened from the dredge spoil at each work site and hauled to the onsite landfill. Boulders and cobbles greater than 6 inches will be rinsed of fine-grained sediment and reused as capping materials. It is assumed that 20% of the volume of dredged materials will be larger than 6 inches and reused and that chemical testing of the screened materials prior to placement will not be required. Concrete and metal debris will be placed in the landfill.
- A total of 27,292 cuyd of the dredge/excavation spoils generated, 6 inches and less, will require disposal. The existing landfill has an assumed available capacity of 21,267 cuyd. The remaining volume (6,025 cuyd) will be transported to off-site disposal facilities. It is assumed that 9% of the total volume disposed off site (542 cuyd) will require stabilization prior to landfill disposal and 1% of the total volume disposed off site (60 cuyd) will be disposed in a RCRA Subtitle C landfill. A summary of the assumed disposal methods is presented in the following table:

Facility	Disposal Facility				Total Volume
	McAllister Landfill	Subtitle D Landfill	Subtitle D with Stabilization	RCRA C Landfill	
Volume (cuyd)	21,267	5,423	542	60	27,292

- The existing landfill cap earthen materials will be stripped, stockpiled and reinstalled after placement of the dredge spoils. The existing geosynthetics will be perforated and left in-place.
- An 8-hour work day is assumed for all construction activities. However, due to accessibility issues and construction difficulties, it is assumed that one hour per day will be required to maintain and mobilize equipment at each work site and one hour per day will be required to secure the work areas and remove equipment from each work site (net production = 6 hours per day). An analysis of overtime labor versus daily equipment rates should be performed at the design phase to determine if cost-benefits exist by working overtime.

BARGE BASED WORK

- It is assumed that Pier 1 at Coddington Cove will be used as a materials, dewatering, and office staging area at no cost. Dewatered dredge spoils will be staged at Pier 1 pending transport to the onsite landfill.

COSTING ASSUMPTIONS

ALTERNATIVE NS/ER-5: DREDGING AND DISPOSAL

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- Due to the presence of landfill debris such as the submarine netting, concrete rubble, boulders, large steel pieces, and shallow bedrock, it is assumed that it will not be feasible to drive sheet pile to stabilize the slope. For the purposes of this estimate only, it is assumed that the landfill slope will be stabilized by a retention system consisting of H-pile/soldier beams drilled 10-20' into the existing bedrock, placed on 5-foot centers, and cross braced with steel walers. The H-piles will serve as the main support for steel sheeting. The sheeting will be driven prior to dredging or, in the event refusal is encountered prior to the desired depth, the sheeting will be installed as the excavation/dredging of the contaminated sediment progresses. Sheeting materials will be removed after the completion of all dredging and backfill activities along the landfill toe. H-piles will be cut flush to grade. Implementation of this option assumes that equipment exists that can access the landfill toe, from either the landfill access road (approximately 100 feet laterally and 25 feet above the work area) or by barge (4-6 feet depth) to drill the H-pile sockets, install the H-piles, install the walers, and install the steel sheeting. The cost presented assumes that all of the work can be accomplished from the landfill access road.
- Preparation, maintenance, and removal of the Pier 1 staging area was estimated at a lump sum of \$11,000, which includes 2 laborers and a backhoe for 10 days and misc. materials. Dewatering/screening activities will be performed on the barge and on shore (as required) to prepare the sediments for on-base disposal. It is assumed that the barge, crew, and dredging equipment cost is \$8,600 per day and shore-based equipment to load/off-load materials to barge is \$6,500/day. Dewatering/screening equipment and crew is assumed to cost \$4,500 per day and is assumed that extensive dewatering will not be required each day. On-site bulking of the sediments is included in the dewatering cost (if necessary). It is assumed that the production rate for the dredging operation will be 200 cuyd per day and the operation will take 115 work days.
- It is assumed that 50 confirmation samples will be collected during the dredging operation to verify the all contaminated sediments exceeding the PRGs is removed and that potential air emissions are below threshold levels. Samples will be analyzed for PCBs, metal, pesticides, and PAHs. Analytical costs are assumed to be \$1,400/sample including shipping costs.
- Placement of approximately 22,933 cuyd of a sand/gravel/stone backfill will be performed by a crane on a barge. No bulking factor is assumed since the materials will be placed through the water column. Since 20% of the dredged material (4,587 cuyd) will be screened and re-used, only 18,346 cuyd of material will be required from off-site sources. Barge rental with equipment and crew is assumed to be \$8,600 per day, shore equipment to load/off-load materials to barge at \$6,500/day; totaling \$15,100/day. A production rate of 600 cuyd placed per day is assumed. Additional costs of a survey crew to verify grades during placement is assumed at \$1,000/day.
- Miscellaneous large boulders will be installed over the sand/gravel/stone to help break waves and assist in habitat restoration. It is assumed that 6 boulders will be placed every 2,500 sf and it is estimated that boulders can be installed over a 15,000 sf area per day by barge.

COSTING ASSUMPTIONS
ALTERNATIVE NS/ER-5: DREDGING AND DISPOSAL
PAGE 4 OF 5

- Water quality testing will be performed daily during dredging and cap installation activities. It is assumed that three samples will be collected daily from outside of the silt curtain work area. Samples will be analyzed for PCBs, PAHs, metals, and total suspended solids (TSS).

SHORE BASED WORK

- A portable cofferdam system will be erected along the southern shoreline extending out to the 3-foot MLW line. The area will be continuously dewatered (24-hour per day) with pumps so that the excavation of sediments can occur in "dry" conditions. Excavated sediments will be screened and hauled directly to the landfill from the excavation site. Backfill materials will be placed immediately following removal of the contaminated sediments. An estimated 11,182 cuyd will be dredged/excavated in this manner. A total of 38 work days is estimated to complete the excavation work.
- Access to the work area will be from along the southeastern limits of the existing landfill, adjacent to the railroad tracks. Construction of a temporary haul road is not anticipated. Excavation, handling, and placement of materials will be accomplished using tracked excavators, a wheeled front-end loader, screener, and off-road dump trucks. Costs include a survey crew to verify grades during placement.
- The backfill materials consisting of sand/gravel/stone will be placed over an area approximately 85,336 sf. Assuming a bulking factor of 20%, approximately 13,418 cuyd of backfill will be placed. Also, since 20% of the dredged material (2,236 cuyd) will be screened and re-used, only 11,182 cuyd of material will be required from off-site sources.
- Miscellaneous large boulders will be installed over the sand/gravel/stone to help break waves and assist in habitat restoration. It is assumed that 6 boulders will be placed every 2,500 sf and it is estimated that boulders can be installed over a 30,000 sf area per day using the shore based equipment.
- Since this work will be performed concurrently with the barge-based work, no additional water quality testing is required. However, testing of discharge water from the dewatering of the excavation behind the cofferdam may be needed.

O&M COST ITEMS:

Since all contamination will be removed, there are no operation and maintenance costs assumed for this alternative. However, there will be an inspection of the cap to verify habitat recovery in years 1, 2, and 5. Also, since contamination remains under the existing landfill cap, monitoring for chemical migration into the clean backfill sediments will also occur in years 1, 2, and 5.

1. Monitoring:

- Sediment chemistry (PCBs, PAHs, metals, Simultaneously Extracted Metals/Acid Volatile

COSTING ASSUMPTIONS
ALTERNATIVE NS/ER-5: DREDGING AND DISPOSAL
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Sulfides (SEM/AVS)); 10 samples plus 3 QC samples

- Biota chemistry 10 samples (PCBs, PAHs, metals);
- Porewater chemistry (metals); 10 samples plus 3 QC samples
- Toxicity Amphipod; 10 samples
- Toxicity Arabacia; 10 samples

Labor: 1 event/year.

- Sediment/Porewater sampling: Sample collection with equipment and crew = approximately \$485/sample. Collection of 10 samples = \$4,850 (QC samples collected at no additional cost)
- Biota sampling : Sample collection with equipment and crew = approximately \$1,043/sample.
- Collection of 10 samples = \$10,430
- Proj. mgmt/coord. □ 30 hours/year @ \$80/hr (w/O&P) = \$2,400
- Annual: add \$300 M&IE; ODCs & supplies @ \$200; & shipping @ \$200.
- Data Validation \$5,808.
- Report prep. \$9,500.

Total Labor \cong \$33,690 annually for years 1, 2 and 5

Estimated analytical costs:

- Sediment chemistry(PCBs, PAHs, metals, SEM/AVS) \$1537/sample @ 13 samples/yr = \$19,981
- Biota chemistry (PCBs, PAHs, metals) @ \$1367/sample @ 10 samples/yr = \$13,670
- Porewater chemistry @ \$250/ sample @ 13 samples/yr = \$3,250
- Toxicity Amphipod @ \$863/ sample @ 10 samples/yr = \$8,630
- Toxicity Arabacia @ \$662/ sample @ 10 samples/yr = \$6,620

Total Analytical \cong \$52,150 annually for years 1, 2, and 5

2. Inspection for Habitat Recovery:

- Inspections to be performed by an Marine Biologist: Assume 2 days (8 hr/day) for inspection and travel and 2 days (16 hr) to prepare an inspection report. 32 hours total @ \$80/hr = \$2,560 plus \$300 ODCs & travel costs, and \$2,000 equipment costs (boat and underwater video). Total quarterly Inspection costs are \$4,860. Total annual costs are \$19,440.

3. 5-year reviews at 200 LOE @ \$100/hr. Approx. \$1500 ODCs. Total = \$ 21,500 per event
Assumed only 1 review to occur in year 5 because virtually all sediment > PRGs will be removed.

TABLE 3
ALTERNATIVE N8/ER-5 CAPITAL COSTS
MCALLISTER POINT LANDFILL, N8N, NEWPORT, RHODE ISLAND

			Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments
Item	Qty	Unit	Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
PRE-DESIGN INVESTIGATION												
1) Sediment/soil borings and analyses	1	LS	112,050.00	0.00	0.00	0.00	112,050	0	0	0	112,050	See Assumptions
2) Slope stability analysis and design	1	LS	88,400.00	0.00	0.00	0.00	88,400	0	0	0	88,400	See Assumptions
MOBILIZATION/DEMOBILIZATION												
1) Office Trailer (1 ea)	23	MO	400.00	0.00	0.00	0.00	9,203	0	0	0	9,203	Historical data
3) Portable Communication Equipment	8	SETS	400.00	0.00	0.00	0.00	3,200	0	0	0	3,200	Historical data
4) Equipment Mobilization/Demobilization (support equip)	1	LS	40,000.00	0.00	0.00	0.00	40,000	0	0	0	40,000	Historical data
5) Site Utility Hook-ups (elec., phone, etc.)	1	LS	3,000.00	0.00	0.00	0.00	3,000	0	0	0	3,000	Historical data
6) Site Utilities	23	MO	4,000.00	0.00	0.00	0.00	92,032	0	0	0	92,032	Historical data
7) 3 Pick-up Truck (rental)	23	MO	2,850.00	450.00	0.00	0.00	65,573	10,354	0	0	75,926	Historical data
8) Certification/Close-out Reports	1	EA	7,000.00	2,000.00	15,000.00	3,000.00	7,000	2,000	15,000	3,000	27,000	Historical data
PERSONNEL AND EQUIP. DECON. FACILITIES AND SERVICES												
1) Personnel Decon. Trailer	23	MO	1,500.00	0.00	200.00	0.00	34,512	0	4,802	0	39,114	Vendor catalog
2) PPE rolloff cont.	23	MO	500.00	0.00	0.00	0.00	11,504	0	0	0	11,504	Historical data
SITE MANAGEMENT STAFFING												
1) Site manager	4,802	HR	0.00	0.00	35.88	0.00	0	0	165,013	0	165,013	Historical data
2) Site engineer	4,802	HR	0.00	0.00	32.00	0.00	0	0	147,251	0	147,251	Historical data
3) Site supervisor/foreman	4,802	HR	0.00	0.00	30.00	0.00	0	0	138,048	0	138,048	Historical data
4) Site safety officer	4,802	HR	0.00	0.00	25.00	0.00	0	0	115,040	0	115,040	Historical data
HOME OFFICE PROJECT MANAGEMENT AND SUPPORT												
1) Project manager	920	HR	0.00	0.00	45.00	0.00	0	0	41,414	0	41,414	Historical data
2) Project administrator	880	HR	0.00	0.00	30.00	0.00	0	0	20,707	0	20,707	Historical data
3) Health and Safety director	230	HR	0.00	0.00	35.00	0.00	0	0	8,053	0	8,053	Historical data
4) Procurement/subcontracting	2,301	HR	0.00	0.00	30.00	0.00	0	0	69,024	0	69,024	Historical data
5) Clerical support	2,301	HR	0.00	0.00	12.36	0.00	0	0	28,438	0	28,438	Historical data
LANDFILL CAP PREP. AND RESTORATION												
1) Survey control (2-man crew)	3,600	HR	0.00	0.00	60.00	15.00	0	0	216,000	54,000	270,000	Historical data
2) Silt Fence	5,000	LF	0.00	0.50	0.35		0	2,500	1,750	0	4,250	022-700-1100
3) Strip existing cap soils and stockpile	7,259	CY	0.00	0.00	0.82	2.09	0	0	4,501	15,171	19,672	17-01-0502
3a) Remove and stage shrubs	1	LS	2,500.00	0.00			2,500	0	0	0	2,500	Historical data
4) Dredge spoil placement (12" lifts, 3 mile R/T)	21,268	CY	0.00	0.28	1.83	6.17	0	5,529	38,917	131,211	175,857	17-03-0422
5) 6" cap layer	1,815	CY	0.00	0.28	1.52	4.78	0	472	2,759	8,839	11,870	17-03-0422
6) Gas vent layer 12"	3,630	CY	0.00	9.11	0.82	2.11	0	33,069	2,977	7,659	43,705	17-03-046
6a) extend/finish existing gas vents	18	EA	500.00	0.00	0.00	0.00	9,000	0	0	0	9,000	Historical data
7) GCL furnish and install	98,000	SF	0.00	0.25	0.07	0.07	0	24,500	6,860	6,860	38,220	33-08-0543
8) 40 mil VLDPE furnish and install	98,000	SF	0.00	0.41	1.07	0.11	0	40,180	104,880	10,780	155,820	33-08-0544
9) 12" drainage layer	3,630	CY	0.00	12.00	0.23	0.34	0	43,560	835	1,234	45,629	Historical data
10) Geotextile furnish and install	10,889	SY	0.00	0.56	0.33	0.03	0	6,088	3,593	327	10,018	33-08-0532
11) 18" Cover soil layer (reuse)	7,259	CY	0.00	0.00	0.23	0.34	0	0	1,670	2,468	4,138	Historical data
12) 6" Topsoil (reuse 70% from existing cap)	1,280	CY	0.00	0.00	1.43	5.14	0	0	1,845	6,631	8,475	18-05-0302
13) 8" Topsoil (30% from off-site)	540	CY	0.00	16.82	3.29	3.62	0	8,975	1,777	1,955	12,706	18-05-0301

TABLE 3
ALTERNATIVE NS/ER-5 CAPITAL COSTS
MCALLISTER POINT LANDFILL, NSN, NEWPORT, RHODE ISLAND
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Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
14) Root reinforcing mat (slopes only)	8,756	SY	0.00	0.78	0.21	0.07	0	6,830	1,839	613	9,281	022-704-0010
15) Jute mat (slopes only)	8,756	SY	0.00	1.75	0.20	0.07	0	15,323	1,751	613	17,687	022-704-0200
16) Extend & finish monitoring wells	2	EA	1,000.00	0.00	0.00	0.00	2,000	0	0	0	2,000	Historical data
17) Revegetation (hydroseed & reuse shrubs)	2.30	AC	589.62	0.00	1,000.00	200.00	1,356	0	2,300	460	4,116	Historical data
18) Restore operations areas	2	AC	5,000.00	0.00	0.00	0.00	10,000	0	0	0	10,000	Historical data
19) Geotechnical testing	150	DY	0.00	5.00	800.00	50.00	0	750	120,000	7,500	128,250	Historical data
20) Revise as-built records and cert. report.	1	EA	0.00	1,000.00	11,000.00	1,500.00	0	1,000	11,000	1,500	13,500	Historical data
DREDGING/WATER TREATMENT												
1) Erosion control, silt boom	3,000	LF	0.00	10.00	4.00	4.00	0	30,000	12,000	12,000	54,000	Historical data
2) Mob/Demob (barge and pier based equip.)	1	LS	167,800.00	0.00	0.00	0.00	167,800	0	0	0	167,800	Vendor Info.
3) Mob/Demob (shore based equip.)	1	LS	5,000.00	0.00	0.00	0.00	5,000	0	0	0	5,000	Vendor Info.
4) Prep., maint., and removal of staging area	1	LS	0.00	1,000.00	7,000.00	3,000.00	0	1,000	7,000	3,000	11,000	Vendor Info.
5) Mobilization/demobilization of drilling equipment	1	LS	100,000.00	0.00	0.00	0.00	100,000	0	0	0	100,000	Historical data
6) Drill sockets for H-piles	3,600	LF	150.00	0.00	0.00	0.00	540,000	0	0	0	540,000	Historical data
7) Mobilization/demob pile/sheet driving equipment	1	LS	75,000.00	0.00	0.00	0.00	75,000	0	0	0	75,000	Historical data
8) Install/grout H-piles and walers @57#/lf)	154	TN	0.00	1,162.50	122.25	228.75	0	178,909	18,814	35,205	232,928	R021-610
9) Install/remove sheeting	18,000	SF	0.00	4.09	5.16	11.80	0	73,620	92,880	208,800	375,300	Historical data
10) Remove H-piles (cut flush to grade)	120	EA	0.00	100.00	250.00	1,200.00	0	12,000	30,000	144,000	186,000	Historical data
11) Porta Dam (install, rental, takedown)	1,200	LF	150.00	0.00	0.00	0.00	180,000	0	0	0	180,000	Historical data
12) Porta Dam dewatering	37	DAY	0.00	0.00	665.00	150.00	0	0	24,787	5,591	30,378	021-440-0410
13) Heavy equipment mob/demob (shore based)	1	LS	10,000.00	0.00	0.00	0.00	10,000	0	0	0	10,000	Historical data
14) Excavate/screen/haul sediments (shore based)	11,182	CY	0.00	0.00	4.93	12.23	0	0	55,127	138,756	191,883	022-238-300
15) Dredge sediments (barge)	22,933	CY	43.00	0.00	0.00	0.00	986,119	0	0	0	986,119	Vendor Info.
16) Treatment of dredge water	115	DAY	4,500.00	0.00	0.00	0.00	515,993	0	0	0	515,993	Vendor Info.
17) Removal of sediments from barge	22,933	CY	32.50	0.00	0.00	0.00	745,323	0	0	0	745,323	Vendor Info.
18) Sediment confirmation testing	50	EA	1,400.00	0.00	0.00	0.00	70,000	0	0	0	70,000	Historical data
19) Water Quality Testing	115	DAY	3,600.00	50.00	200.00	150.00	412,794	5,733	22,933	17,200	458,660	Historical data
20) Disposal/Transport to RCRA D Landfill	8,134	TN	110.00	0.00	0.00	0.00	894,713	0	0	0	894,713	Vendor Info.
21) D/T to RCRA D Landfill w/ stabilization	813	TN	350.00	0.00	0.00	0.00	284,681	0	0	0	284,681	Vendor Info.
22) Disposal/Transport to RCRA C Landfill	90	TN	500.00	0.00	0.00	0.00	45,188	0	0	0	45,188	Vendor Info.
BACKFILL PLACEMENT												
1) Installation of 2 feet imported sand/gravel/stone (shore	11,182	CY	0.00	15.00	4.93	11.23	0	167,730	55,127	125,674	348,431	Vendor Info.
2) Installation of 2 feet screened sand/gravel/stone (shore	2,236	CY	0.00	0.00	4.93	11.23	0	0	11,025	25,115	36,140	Vendor Info.
3) Strategically Placed Boulders (shore based)	3	DAY	0.00	2,880.00	2,960.00	8,740.00	0	8,640	8,880	20,220	37,740	See assumptions
4) Installation of 2 foot imported sand/gravel cap (barge ba	18,346	CY	25.17	15.00	1.66	0.00	461,779	275,196	30,455	0	767,430	Vendor Info.
5) Installation of 2 foot screened sand/gravel cap (barge ba	4,587	CY	25.17	0.00	1.66	0.00	115,445	0	7,614	0	123,058	Vendor Info.
6) Strategically Placed Boulders (barge based)	8	DAY	15,100.00	1,440.00	0.00	0.00	120,800	11,520	0	0	132,320	See assumptions
7) Water quality monitoring (3 samples/day)	38	DAY	3,600.00	50.00	200.00	150.00	137,598	1,911	7,644	5,733	152,887	Historical/Vendor
TOTAL							8,359,361	967,398	1,662,109	999,615	9,988,683	

TABLE 3
 ALTERNATIVE NS/ER 5 CAPITAL COSTS
 MCALLISTER POINT LANDFILL, NSN, NEWPORT, RHODE ISLAND
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			Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments
Item	Qty	Unit	Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
Direct Cost Adjustment Factors												
Safety Level D Multiplier (5% of labor and equipment, for non-Lev. C activities)							0	0	83,106	49,991	133,098	
Safety Level C Multiplier (25% of labor and equipment, as listed)							0	0	0	0	0	
Site & Industrial Health & Safety Monitoring (4% of labor and equipment)							0	0	66,484	39,993	106,477	
Subtotal Direct Costs							6,369,361	987,398	1,745,215	1,049,806	10,228,256	
Indirect Cost Adjustment Factors												
Labor Overhead @ 250% (for field mgmt. & home office, only)							0	0	1,869,972	0	1,869,972	
Field Construction Labor Overhead @ 75%							0	0	685,590	0	685,590	
Subcontract Overhead @ 10%							635,936	0	0	0	635,936	
Tax on Materials @ 5%							0	48,370	0	0	48,370	
G & A @ 10% (on labor, equip., & mat'l's.)							0	96,740	174,621	104,981	376,242	
Subtotal Direct and Indirect Costs							6,995,297	1,112,508	4,475,299	1,154,786	13,844,367	
Cost Adjustment Factors												
City/Location Cost Adjustment Factor @ 7% (ref. 1)											969,106	
Adjusted Direct and Indirect Costs							6,995,297	1,112,508	4,475,299	1,154,786	14,813,473	
Engineering @ 6 % of total direct and indirect											888,808	
Prime Contractor Fee @ 10% of Total Adjusted Cost											1,481,347	
Total Costs											17,183,628	
Contingency @ 30% of Total Cost											5,155,088	
TOTAL ESTIMATED COST											22,338,717	

References used for cost estimates:

- 1) Means Heavy Construction Cost Data, 1998, 12th Annual Edition, R.S. Means Co., Inc., Kingston, MA
- 2) Echos Environmental Remediation Unit Cost, 1998, 4th Annual Edition, Delta Technologies Group, Inc., Englewood, CO
- 3) Echos Environmental Remediation Assemblies Cost, 1998, 4th Annual Edition, Delta Technologies Group, Inc., Englewood, CO
- 4) Historical data based on competitive bids submitted by subcontractors or actual costs at this or other sites.

TABLE 4
ALTERNATIVE NS/ER-5 PRESENT WORTH COST
MCALLISTER POINT LANDFILL, NSN, NEWPORT, RHODE ISLAND

PRESENT WORTH ANALYSIS

YEAR	PRESENT WORTH FACTOR	CAPITAL COSTS	O & M COSTS	5-YEAR COSTS	PRESENT WORTH
0	1.000	\$22,338,717			\$22,338,717
1	0.935		\$105,280		\$98,393
2	0.873		\$105,280		\$91,956
3	0.816				\$0
4	0.763				\$0
5	0.713		\$105,280	\$21,500	\$90,392
6	0.666				\$0
7	0.623				\$0
8	0.582				\$0
9	0.544				\$0
10	0.508				\$0
11	0.475				\$0
12	0.444				\$0
13	0.415				\$0
14	0.388				\$0
15	0.362				\$0
16	0.339				\$0
17	0.317				\$0
18	0.296				\$0
19	0.277				\$0
20	0.258				\$0
21	0.242				\$0
22	0.226				\$0
23	0.211				\$0
24	0.197				\$0
25	0.184				\$0
26	0.172				\$0
27	0.161				\$0
28	0.150				\$0
29	0.141				\$0
30	0.131				\$0
TOTAL PRESENT WORTH =					\$22,619,457

Discount rate of 7% per OSWER Directive No. 9355.3-20, June 25, 1993

**COSTING ASSUMPTIONS
ALTERNATIVE OS-2: LIMITED ACTION**

CAPITAL COSTS: NONE

O&M COSTS:

1. Long-term Monitoring:

- Sediment chemistry (PCBs, PAHs, metals, Simultaneously Extracted Metals/Acid Volatile Sulfides (SEM/AVS)); 16 samples plus 4 QC samples
- Biota chemistry 16 samples (PCBs, PAHs, metals);
- Toxicity Amphipod; 16 samples
- Toxicity Arabacia; 16 samples

Labor: 1 event/year.

- Sediment sampling: Sample collection with equipment and crew = approximately \$485/sample. Collection of 16 samples = \$7,760 (QC samples collected at no additional cost)
- Biota sampling : Sample collection with equipment and crew = approximately \$1043/sample.
- Collection of 16 samples = \$16,688
- Proj. mgmt/coord. 30 hours/year @ \$80/hr (w/O&P) = \$2,400
- Annual: add \$500 M&IE; ODCs & supplies @ \$300; & shipping @ \$300.
- Data Validation \$9,240.
- Report prep. \$12,200.

Total Labor \cong \$40,148 annually for years 1-5 and at 5 -year review cycles

Estimated analytical costs:

- Sediment chemistry (PCBs, PAHs, metals, SEM/AVS) \$1537/sample @ 20 samples/yr = \$30,740
- Biota chemistry (PCBs, PAHs, metals) @ \$1367/sample @ 16 samples/yr = \$21,872
- Toxicity Amphipod @ \$863/ sample @ 16 samples/yr = \$13,808
- Toxicity Arabacia @ \$662/ sample @ 16 samples/yr = \$10,592

Total Analytical \cong \$70,012 annually for years 1-5 and at 5 -year review cycles

2. 5-year reviews at 200 LOE @ \$100/hr. Approx. \$1500 ODCs. Total = \$21500 per event
Reviews to occur in years 5, 10, 15, 20, 25, and 30.

TABLE 5
ALTERNATIVE OS-2 PRESENT WORTH COST
MCALLISTER POINT LANDFILL, NSN, NEWPORT, RHODE ISLAND

PRESENT WORTH ANALYSIS					
YEAR	PRESENT WORTH FACTOR	CAPITAL COSTS	O & M COSTS	5-YEAR COSTS	PRESENT WORTH
0	1.000	\$0			\$0
1	0.935		\$110,160		\$102,953
2	0.873		\$110,160		\$96,218
3	0.816		\$110,160		\$89,923
4	0.763		\$110,160		\$84,041
5	0.713		\$110,160	\$21,500	\$93,872
6	0.666		\$0		\$0
7	0.623		\$0		\$0
8	0.582		\$0		\$0
9	0.544		\$0		\$0
10	0.508		\$110,160	\$21,500	\$66,929
11	0.475		\$0		\$0
12	0.444		\$0		\$0
13	0.415		\$0		\$0
14	0.388		\$0		\$0
15	0.362		\$110,160	\$21,500	\$47,720
16	0.339		\$0		\$0
17	0.317		\$0		\$0
18	0.296		\$0		\$0
19	0.277		\$0		\$0
20	0.258		\$110,160	\$21,500	\$34,023
21	0.242		\$0		\$0
22	0.226		\$0		\$0
23	0.211		\$0		\$0
24	0.197		\$0		\$0
25	0.184		\$110,160	\$21,500	\$24,258
26	0.172		\$0		\$0
27	0.161		\$0		\$0
28	0.150		\$0		\$0
29	0.141		\$0		\$0
30	0.131		\$110,160	\$21,500	\$17,296
TOTAL PRESENT WORTH =					\$657,233

Discount rate of 7% per OSWER Directive No. 9355.3-20, June 25, 1993

Expected Outcomes of the Selected Remedies

Implementation of the Selected Remedy will result in the removal from the site of all sediment with contaminant levels exceeding the cleanup levels presented in Table 1. The Navy anticipates that once the Selected Remedy has been completed the sediment in the nearshore areas would be clean enough that contact with site sediments would cause no health or environmental impacts. However, due to the proximity of the McAllister Point Landfill, and other waste cleanup activities near the site, the Navy does not expect that unrestricted public access to the area would be allowed. The existence of the McAllister Point Landfill would also probably restrict future uses of the site and prevent the use of groundwater beneath the site. The ecology of the intertidal area is expected to recover fully once contaminated sediments are removed and clean fill is reintroduced to the area.

The Navy anticipates that there will be little or no change to the offshore environment resulting from the remedy. Ongoing monitoring will determine sediment contaminant levels in this area and allow re-evaluation of risks. Contaminant levels are anticipated to remain within PRGs and pose little threat to the environment. The depth of the water in this sub-tidal area will effectively prevent any human contact with contaminated sediments, and the Navy expects the eventual natural attenuation of low concentrations of contaminants in this area.

2.12 STATUTORY DETERMINATIONS

Under CERCLA section 121, the Navy must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ, as a principal element, treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes. The following sections discuss how the Selected Remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy for nearshore/elevated-risk offshore sediments (NS/ER-5) will protect human health and the environment through the excavation and landfill disposal of landfill debris and contaminated sediments and the restoration of the intertidal area to its existing grade using clean fill. Sediment removal (and disposal in a RCRA-compliant landfill) will eliminate the threat of exposure to the chemicals of concern via ingestion of contaminated shellfish taken from the area (the principal pathway of concern for human

health risks). By removing contaminants from contact with the environment, this remedy also eliminates ecological risks from contaminants at the site. The short-term risks of implementing this remedy can be controlled with appropriate dredging, engineering, and worker-protection safeguards. The disposal of the contaminated sediments in a RCRA-compliant landfill (at McAllister Point Landfill or off site) will assure that there are no adverse cross-media impacts from the selected remedy.

The selected remedy for the offshore areas (OS-2) will protect human health and the environment through continued monitoring of these moderately contaminated areas. These areas are inaccessible to shellfishing and direct contact, which should effectively their potential human health risks. As noted above, sediment contamination in the offshore areas poses low to intermediate probability of risk to ecological receptors, but the current data indicate that concentrations do not exceed the selected PRGs. There are no short-term risks from the monitoring activity that cannot be easily controlled. There are no adverse cross-media impacts from the Selected Remedy.

Compliance with Applicable or Relevant and Appropriate Requirements

NS/ER-5, the Near Shore Selected Remedy of dredging and landfilling of contaminated sediments and restoration of the excavated areas to existing grade will comply with all ARARs. The Navy has determined, and EPA and RIDEM concur, that excavation and off-site disposal of the nearshore and elevated-risk offshore area, and monitoring of the offshore area is the least damaging practicable alternative in regards to the protection of aquatic habitats regulated under Section 404 of the Clean Water Act, 33 U.S.C. § 1344. Post-remedial monitoring will be performed to ensure that the remedy remains protective of human health in accordance with RIDEM's prior determination under the Rhode Island *Rules and Regulations for the Investigations and Remediation of Hazardous Material Releases*. If such sampling indicates an unacceptable human health risk as defined in the Rules in any area targeted for remediation, further action will be required and an additional decision document may be issued. As required by applicable statutes, federal and state authorities will be consulted in regards to the protection of fish and wildlife, endangered species, coastal zone, and historic and archeological resources. Chemical, Location, and Action-Specific ARARs for NS/ER-5 include the following:

Federal ARARs for NS/ER-5

- Clean Water Act – dredging discharge regulations, AWQC, NPDES (40 USC 1314; 33 USC 1342, 1344; 33 CFR 320-323; 40 CFR 122-125, 131, 230)
- Rivers and Harbors Act – regulations regarding alterations of navigable waterways (33 USC 403; 33 CFR 320-323)
- Resource Conservation and Recovery Act, Subtitle C – Standards for Hazardous Waste Facilities (42 USC 6291 *et seq.*; 40 CFR 264)

- Clean Air Act National Emission Standards for Hazardous Air Pollutants (42 USC 7411, 7412; 40 CFR 61)
- Coastal Zone Management Act (16 USC 1451 *et seq.*)
- Endangered Species Act (16 USC 1531 *et seq.*; 50 CFR 200, 402)
- Fish & Wildlife Coordination Act (16 USC Part 661 *et seq.*; 40 CFR 122.49)
- National Historic Preservation Act (16 USC 470 *et seq.*; 26 CFR Part 800)
- Various Executive Orders (11990 re: protection of wetlands; 11988 re: floodplain management)

Rhode Island ARARs for NS/ER-5

- Water Pollution Control – water use and water quality criteria, discharge criteria, effluent monitoring requirements (RIGL 46-12, -16 *et seq.*; CRIR 12-190-001, 003; ENVM 112-88.97-1)
- Hazardous Waste Management – hazardous waste facility location regulations, identification and listing of wastes, standards for TSD facilities (RIGL 23-19.1 *et seq.*; CRIR 12-030-003(3.25, 10.00))
- Remediation Regulations – remediation requirements for impacted media (DEM-DSR-01-93 Sec. 8)
- Refuse Disposal – regulations for solid waste management facilities (RIGL 23-18.9 *et seq.*; CRIR 12-030-03(10.00))
- Clean Air Act – regulations related to fugitive dust, “emissions detrimental to persons or property,” air emission units, odors, and air toxics (RIGL 23-23 *et seq.*; CRIR 12-31-05, -07, -09, -17, -22)
- Coastal Resources Management (RIGL 46-23-1 *et seq.*)
- Endangered Species Act (RIGL 20-37-1 *et seq.*)

Tables 6, 7, and 8 present a detailed assessment of how alternative NS/ER-5 will comply with the identified ARARs.

OS-2, the Offshore Selected Remedy of monitoring, will also comply with all ARARs. Chemical, Location, and Action-Specific ARARs for OS-2 include the following:

Federal ARARs for OS-2

- Clean Water Act – AWQC (40 USC 1314; 40 CFR 122.44)
- Resource Conservation and Recovery Act, Subtitle C – Standards for Hazardous Waste Facilities and Subtitle D – Standards for Solid Waste Facilities (40 USC 6291; 40 CFR 258, 264)
- Fish and Wildlife Coordination Act (16 USC 661 *et seq.*; 40 CFR 122.49)
- Endangered Species Act (16 USC 1531 *et seq.*; 50 CFR 200, 402)
- Coastal Zone Management Act (16 USC 1451 *et seq.*)
- National Historic Preservation Act (16 USC 470 *et seq.*; 26 CFR Part 800)
- Executive Order 1190 – wetland protection (40 CFR 6, Appendix A)

TABLE 6
ASSESSMENT OF CHEMICAL-SPECIFIC ARARs AND TBCs
ALTERNATIVE NS/ER-5: DREDGING AND DISPOSAL
MARINE SEDIMENT/MANAGEMENT OF MIGRATION FEASIBILITY STUDY
MCALLISTER POINT LANDFILL, NSN - NEWPORT, RI

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
EPA Human Health Assessment Cancer Slope Factors (CSFs).		To Be Considered	These are guidance values used to evaluate the potential carcinogenic hazard caused by exposure to contaminants.	Used to compute the individual incremental cancer risk resulting from exposure to carcinogenic contaminants in site media.
EPA Risk Reference Doses (RfDs)		To Be Considered	Toxicity values for evaluating non-carcinogenic hazards from exposures to contamination.	Used to characterize human health risks due to non-carcinogens in site media.
Clean Water Act, Section 304	40 USC 1314; 40 CFR 122.44	Relevant and Appropriate	Establish Ambient Water Quality Criteria (AWQC): Guidelines for the protection of human health and/or the aquatic organisms.	These standards are relevant and appropriate for sediment PRGs derived using these water quality criteria. Sediments exceeding PRGs must be adequately addressed to meet these standards.

STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Remediation Regulations – Risk Management Section	DEM-DSR-01-93 Section 8	Relevant and Appropriate	This section of the remediation regulations sets forth remediation requirements for impacted media at contaminated sites.	Preliminary remediation goals were developed to minimize the risk to affected media. Refer to the PRG development document (Appendix D of the Final FS) and RIDEM's letter to the Navy dated May 28, 1999.
Water Pollution Control	RIGL 46-12 <i>et seq.</i> ; ENVM 112-88.97-1	Relevant and Appropriate	Establishes water use classification and water quality criteria for waters of the state. Also establishes acute and chronic water quality criteria for the protection of aquatic life.	These standards are relevant and appropriate for sediment PRGs derived using these water quality criteria. Sediments exceeding PRGs must be adequately addressed to meet these standards.

TABLE 7
ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
ALTERNATIVE NS/ER-5 - DREDGING AND DISPOSAL
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN - NEWPORT, RHODE ISLAND

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Executive Order 11990 RE: Protection of Wetlands	40 CFR Part 6, Appendix A	Applicable	This Order requires Federal agencies to take action to avoid adversely impacting wetlands wherever possible, to minimize wetlands destruction and to preserve the values of wetlands, and to prescribe procedures to implement the policies and procedures of this Executive Order.	Restoration and preservation of the intertidal wetlands altered by the remedial action will be conducted so that the wetlands' natural and beneficial values can be realized. Implementation of the Order will be considered and incorporated into any plan or action, wherever feasible.
Clean Water Act, Section 404	33 USC 1344; 40 CFR Part 230 and 33 CFR Parts 320- 323	Applicable	This statute regulates the discharge of dredge and fill materials into Waters of the United States, including special aquatic sites - such as wetlands, intertidal habitats, and vegetated shallows. Such discharges are not allowed if practicable alternatives are available.	Refilling of the excavated/dredged aquatic habitats will only satisfy this requirement if no practicable alternative that has less effect is available. Impacts to aquatic habitats would be mitigated as part of this alternative.
Rivers and Harbors Act, Section 10	33 USC 403; 33 CFR Parts 320-323	Applicable	Sets forth criteria for obstructions or alterations of navigable waters.	Excavation/dredging and habitat restoration will comply with the Act's environmental standards.

TABLE 7
ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
ALTERNATIVE NS/ER-5 - DREDGING AND DISPOSAL
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN - NEWPORT, RHODE ISLAND
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FEDERAL REQUIREMENTS (Cont'd)

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Executive Order 11988 RE: Floodplain Management	40 CFR Part 6, Appendix A	Applicable	The Order requires Federal agencies to evaluate the potential effects of actions it may take within a designated 100-year floodplain of a waterway to avoid adversely impacting floodplains wherever possible.	The potential for restoring and preserving floodplains so that their natural and beneficial values can be realized will be considered and incorporated into any plan or action wherever feasible.
Fish and Wildlife Coordination Act	16 USC Part 661 <i>et. seq.</i> ; 40 CFR 122.49	Applicable	This statute requires consultation with appropriate agencies to protect fish and wildlife when federal actions result in control or structural modification of a body of water or to critical habitat upon which endangered or threatened species depends.	The appropriate agencies will be consulted to find ways to minimize adverse effects to fish and wildlife from the implementation of the proposed removal and restoration remedy.

TABLE 7
ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
ALTERNATIVE NS/ER-5 - DREDGING AND DISPOSAL
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN - NEWPORT, RHODE ISLAND
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FEDERAL REQUIREMENTS (Cont'd)

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Endangered Species Act	16 USC 1531 <i>et seq.</i> , 50 CFR Part 200, 50 CFR Part 402	Applicable	If a location contains a federal endangered or threatened species or its critical habitat, and an action may impact the species or its habitat, the U.S. Fish & Wildlife Service or the National Marine Fisheries Service must be consulted.	The federally endangered loggerhead turtle (<i>Caretta caretta</i>) and federally threatened Kemp's ridley turtle (<i>Lepidochelys kempii</i>) occur in the waters of Narragansett Bay. Appropriate agencies will be consulted to find ways to minimize adverse effects to the listed species from the removal and restoration remedy.
Coastal Zone Management Act	16 USC Parts 1451 <i>et. seq.</i>	Applicable	Requires that any actions must be conducted in a manner consistent with state approved management programs.	The entire site is located in a coastal zone management area, therefore, applicable coastal zone management requirements need to be addressed.
National Historic Preservation Act	16 USC 470 <i>et seq.</i> , 26 CFR Part 800	Applicable	Requires action to take into account effects on properties included on or eligible for the National Register of Historic Places and minimizes harm to National Historic Landmarks	Historic vessels may be sunken in the area. Excavation/dredging, and restoration activities will be carried out to minimize potential harm to historic sites.

TABLE 7
ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
ALTERNATIVE NS/ER-5 - DREDGING AND DISPOSAL
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN - NEWPORT, RHODE ISLAND
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STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Hazardous Waste Management - Location Standards for Hazardous Waste Facilities	RIGL 23-19.1-7; CRIR 12-030-003 (10.00)	Relevant and Appropriate	RI is delegated to administer the federal RCRA statute through its state regulations. The standards of 40 CFR 264.18(b) are incorporated by reference. A facility, including an existing landfill, located in a 100 year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood, unless the owner can demonstrate to the Regional Administrator's satisfaction that no adverse effects on human health or the environment will result if washout occurs.	Some of the landfill wastes in the nearshore area may be classified as hazardous waste. Removal of these materials will permanently eliminate the risk of washout. The standard is "relevant and appropriate" because materials that may be classified as hazardous were disposed in the landfill prior to 1980.
Coastal Resources Management	RIGL 46-23-1 <i>et seq.</i>	Applicable	Sets standards for management and protection of coastal resources.	The entire site is located in a coastal resource management area, therefore, applicable coastal resource management requirements need to be addressed.

TABLE 7
ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
ALTERNATIVE NS/ER-5 - DREDGING AND DISPOSAL
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN - NEWPORT, RHODE ISLAND
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STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Endangered Species Act	RIGL 20-37-1 <i>et seq.</i>	Applicable	Regulates activities affecting state-listed endangered or threatened species or their critical habitat.	The state listed loggerhead turtle (<i>Caretta caretta</i>) and Kemp's ridley turtle (<i>Lepidochelys kempii</i>) occur in the waters of Narragansett Bay. Appropriate state agencies will be consulted to find ways to minimize adverse effects to the listed species from the implementation of the removal and restoration remedy.

TABLE 8
ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
ALTERNATIVE NS/ER-5: DREDGING AND DISPOSAL
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN, NEWPORT, RI

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Resource Conservation and Recovery Act (RCRA), Subtitle C - Standards for Hazardous Waste Facilities	42 USC 6291 <i>et seq.</i> ; 40 CFR Part 264	Relevant and Appropriate	RI is delegated to administer the federal RCRA statute through its state regulations. The standards of 40 CFR Part 264 are incorporated by reference.	Landfill debris and sediments that may constitute hazardous waste will be permanently removed from the site. Monitoring will assess whether hazardous wastes are present in discharges from the excavation/dredging and dewatering activities. The standard is "relevant and appropriate" since wastes that may be classified as hazardous were disposed in the landfill prior to 1980.
Clean Water Act (CWA), Section 402, National Pollutant Discharge Elimination System (NPDES)	33 USC 1342; 40 CFR 122-125, 131	Applicable	These standards govern discharge of water into surface waters. Regulated discharges must meet ambient water quality criteria (WQC).	Any drainage off the temporary debris/sediment storage area and any dewatering discharge will be treated by an on-site treatment plant and discharged into Narragansett Bay.
Clean Air Act (CAA), National Emission Standards for Hazardous Air Pollutants (NESHAPS)	42 USC 7411, 7412; 40 CFR Part 61	Applicable	NESHAPS are a set of emission standards for specific chemicals, including naphthalene, arsenic, cadmium, chromium, lead, mercury, nickel, PCBs, DDE, and hexachlorobenzene. Certain activities are regulated including site remediation.	Monitoring of air emissions from the dewatering facility will be used to assess compliance with these standards if threshold levels are reached. Operation and maintenance activities will be carried out in a manner which will minimize potential air releases.

TABLE 8
ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
ALTERNATIVE NS/ER-5: DREDGING AND DISPOSAL
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN, NEWPORT, RI
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STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Hazardous Waste Management - Identification and Listing of Hazardous Wastes	RIGL 23-19.1; CRIR 12-030-003(3.25)	Relevant and Appropriate	RI is delegated to administer the federal Resource Conservation and Recovery Act (RCRA) statute through its state regulations. The standards of 40 CFR Part 261 regarding RCRA identification and listing are incorporated by reference.	Landfill debris and sediments that may constitute hazardous waste continue out from the landfill into Narragansett Bay. These wastes will be removed. Monitoring will assess whether hazardous wastes are being released from the excavation/dredging. The standard is "relevant and appropriate" since wastes that may be classified as hazardous were disposed in the landfill prior to 1980.
Hazardous Waste Management - Standards for Treatment, Storage, and Disposal Facilities	RIGL 23-19.1 <i>et seq.</i> ; CRIR 12-030-003(10.00)	Applicable	Outlines specifications and standards for design, operation, closure, and monitoring of performance for hazardous waste storage, treatment, and disposal facilities. The standards of 40 CFR Part 264 are incorporated by reference.	Landfill debris and sediments that may constitute hazardous waste will be permanently removed from the site. Removal, dewatering, and treatment dewatering fluids will satisfy these provisions for any hazardous wastes excavated.
Refuse Disposal - Solid Waste Management Facilities	RIGL 23-18.9 <i>et seq.</i> ; CRIR 12-030-003(10.00)	Applicable	Rules and regulations more stringent than the federal standards under 40 CFR Part 258 are applicable. The standards require minimization of environmental hazards associated with the operation of solid waste facilities.	Removal of all landfill debris will satisfy the substantive requirements of these provisions. Removal of non-hazardous sediments and using waste piles for dewatering prior to disposal in a RCRA Subtitle D facility will satisfy the substantive requirements of these provisions.
Clean Air Act - Fugitive Dust Control	RIGL 23-23 <i>et seq.</i> ; CRIR 12-31-05	Applicable	Requires that reasonable precaution be taken to prevent particulate matter from becoming airborne.	Removal, processing, and temporary storage of debris and sediments during dewatering and before shipment would be implemented to prevent material from becoming airborne.

TABLE 8
ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
ALTERNATIVE NS/ER-5: DREDGING AND DISPOSAL
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN, NEWPORT, RI
PAGE 3 OF 4

STATE OF RHODE ISLAND REQUIREMENTS (CONT'D)

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Clean Air Act - Emissions Detrimental to Persons or Property	RIGL 23-23 <i>et seq.</i> ; CRIR 12-31-07	Applicable	Prohibits emissions of contaminants which may be injurious to humans, plant or animal life or cause damage to property or which reasonably interferes with the enjoyment of life and property.	Removal, processing, and temporary storage of debris and sediments during dewatering and before shipment would be implemented to prevent emissions of contaminants. Monitoring of air emissions from the dewatering facility will be used to assess compliance with these standards if threshold levels are reached.
Clean Air Act - Air Pollution Control	RIGL 23-23 <i>et seq.</i> ; CRIR 12-31-09	Applicable	Establishes guidelines for the construction, installation, or operation of potential air emission units. Establishes permissible emission rates for some contaminants.	Site processing of debris and sediment and treatment of dewatering liquid will meet the substantive provisions of the standards if threshold levels are reached.
Clean Air Act - Odors	RIGL 23-23 <i>et seq.</i> ; CRIR 12-31-17	Applicable	Prohibits the release of objectionable odors across property lines.	Site processing of debris and sediment and treatment of dewatering liquid will meet the substantive provisions of the standards.
Clean Air Act - Air Toxics	RIGL 23-23 <i>et seq.</i> ; CRIR 12-31-22	Applicable	Prohibits the emission of specified contaminants at rates which would result in ground level concentrations greater than acceptable ambient levels or acceptable ambient levels as set in the regulations	Monitoring of air emissions from the dewatering facility will be used to assess compliance with these standards if threshold levels are reached. Operation and maintenance activities will be carried out in a manner which will minimize potential air releases.

TABLE 8
ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
ALTERNATIVE NS/ER-5: DREDGING AND DISPOSAL
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN, NEWPORT, RI
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STATE OF RHODE ISLAND REQUIREMENTS (CONT'D)

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Water Pollution Control - Water Quality	RIGL 42-16 <i>et seq.</i> ; CRIR 12-190-001	Applicable	Establishes water use classification and water quality criteria for waters of the state. Also establishes criteria for discharge to a water body.	Any drainage from the temporary debris/sediment storage area and any dewatering discharge will be treated as required to meet this ARAR and discharged into Narragansett Bay.
Water Pollution Control - Pollution Discharge Elimination Systems	RIGL 42-16 <i>et seq.</i> ; CRIR 12-190-003	Applicable	Contains applicable effluent monitoring requirements, and standards and special conditions for discharges.	The substantive provisions of these standards will be satisfied through on-site treatment of all discharges prior to being released into the Bay.

State ARARs for OS-2

- Water Pollution Control – water use classifications and water quality criteria (RIGL 46-12 *et seq.*; ENVM 112-88.97-1)
- Hazardous Waste Management – identification and listing of wastes, standards for TSD facilities (RIGL 23-19.1 *et seq.*; CRIR 12-030-003(3.25, 10.00))
- Remediation Regulations – remediation requirements for impacted media (DEM-DSR-01-93 Sec. 8)
- Refuse Disposal – regulations for solid waste management facilities (RIGL 23-18.9 *et seq.*; CRIR 12-030-03(10.00))
- Coastal Resources Management (RIGL 46-23-1 *et seq.*)
- Endangered Species Act (RIGL 20-37-1 *et seq.*)

Tables 9, 10, and 11 present a detailed assessment of how alternative OS-2 will comply with the identified ARARs.

Cost Effectiveness

The Navy believes that the Selected Remedies are cost-effective for mitigating the human health and environmental risks from site wastes. Section 300.430(f)(ii)(D) of the National Contingency Plan requires federal agencies to determine cost-effectiveness by evaluating the cost of an alternative relative to its overall effectiveness. Effectiveness is defined by three of the five balancing criteria: long-term effectiveness, short-term effectiveness; and reduction of toxicity, mobility, and volume of the waste through treatment. The overall effectiveness is then compared to cost to ensure that the Selected Remedy is cost-effective.

Although it is the most expensive alternative considered, NS/ER-5 is the only remedy that provides assured long-term effectiveness because it removes contaminated sediment from the intertidal and high-risk sub-tidal areas at the site. The estimated present-worth cost of the Selected Remedy for the NS/ER areas is \$22,619,000. NS/ER-3 (Capping, estimated present-worth cost \$12,933,000) and NS/ER-4 (Capping with Dredging to Match Existing Grade, estimated present-worth cost \$18,129,000) could potentially provide cleanups that are effective in the long term, but the construction and maintenance of a cap within the site's high-energy marine environment would be extremely difficult. No good data exists on whether such a cap could be constructed to survive a 100-year storm event, as required by law. Therefore the Navy and EPA concluded that these alternatives would not provide an effective solution to contamination at the site. NS/ER-1 and NS/ER-2 are not effective remedies.

OS-2 provides a short- and long-term effective solution to contamination in offshore areas by monitoring the moderately contaminated sediments to evaluate changes in contaminant concentrations and identify

TABLE 9
ASSESSMENT OF CHEMICAL-SPECIFIC ARARs AND TBCs
ALTERNATIVE OS-2: LIMITED ACTION
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN - NEWPORT, RI

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Clean Water Act, Section 304	40 USC 1314; 40 CFR 122.44	Relevant and Appropriate	Establish Ambient Water Quality Criteria (AWQC): Guidelines for the protection of human health and/or the aquatic organisms.	These standards are relevant and appropriate for sediment PRGs derived using these water quality criteria. Sediments exceeding PRGs must be adequately addressed to meet these standards.

STATE OF RHODE ISLAND REQUIREMENTS

Requirement ¹	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Water Pollution Control	RIGL 46-12 <i>et seq.</i> ; ENVM 112-88.97-1	Relevant and Appropriate	Establishes water use classification and water quality criteria for waters of the state. Also establishes acute and chronic water quality criteria for the protection of aquatic life.	These standards are relevant and appropriate for sediment PRGs derived using these water quality criteria. Sediments exceeding PRGs must be adequately addressed to meet these standards.

TABLE 10
ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
ALTERNATIVE OS-2: LIMITED ACTION
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN - NEWPORT, RHODE ISLAND

FEDERAL REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Executive Order 11990 RE: Protection of Wetlands	40 CFR Part 6, Appendix A	Applicable	This Order requires Federal agencies to take action to avoid adversely impacting wetlands wherever possible, to minimize wetlands destruction and to preserve the values of wetlands, and to prescribe procedures to implement the policies and procedures of this Executive Order.	The potential for restoring and preserving subtidal wetlands so that their natural and beneficial values can be realized will be considered wherever feasible if subtidal wetlands are identified on site.
Fish and Wildlife Coordination Act	16 USC Part 661 <i>et. seq.</i> ; 40 CFR 122.49	Applicable	This statute requires consultation with appropriate agencies to protect fish and wildlife when federal actions result in control or structural modification of a body of water or to critical habitat upon which endangered or threatened species depends.	Appropriate agencies will be consulted to find ways to minimize adverse effects to fish and wildlife from monitoring activities.

TABLE 10
ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
ALTERNATIVE OS-2: LIMITED ACTION
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN - NEWPORT, RHODE ISLAND
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FEDERAL REQUIREMENTS (Cont'd)

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Endangered Species Act	16 USC 1531 <i>et seq.</i> , 50 CFR Part 200, 50 CFR Part 402	Applicable	If a location contains a federal endangered or threatened species or its critical habitat, and an action may impact the species or its habitat, the U.S. Fish & Wildlife Service or the National Marine Fisheries Service must be consulted..	The federally endangered loggerhead turtle (<i>Caretta caretta</i>) and federally threatened Kemp's ridley turtle (<i>Lepidochelys kempii</i>) occur in the waters of Narragansett Bay. Appropriate agencies will be consulted to find ways to minimize adverse effects to the listed species and its habitat from monitoring activities.
Coastal Zone Management Act	16 USC Parts 1451 <i>et. seq.</i>	Applicable	Requires that any actions must be conducted in a manner consistent with state approved management programs.	The entire site is located in a coastal zone management area, therefore, applicable coastal zone management requirements need to be addressed.
National Historic Preservation Act	16 USC 470 <i>et seq.</i> , 26 CFR Part 800	Applicable	Requires action to take into account effects on properties included on or eligible for the National Register of Historic Places and minimizes harm to National Historic Landmarks	Historic vessels may be sunken in the area. Monitoring activities will be carried out to minimize potential harm to historic sites.

TABLE 10
ASSESSMENT OF LOCATION-SPECIFIC ARARs AND TBCs
ALTERNATIVE OS-2: LIMITED ACTION
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN - NEWPORT, RHODE ISLAND
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STATE OF RHODE ISLAND REQUIREMENTS

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Coastal Resources Management	RIGL 46-23-1 <i>et seq.</i>	Applicable	Sets standards for management and protection of coastal resources.	The entire Site is located in a coastal resource management area, therefore, applicable coastal resource management requirements need to be addressed.
Endangered Species Act	RIGL 20-37-1 <i>et seq.</i>	Applicable	Regulates activities affecting state-listed endangered or threatened species or their critical habitat.	The state listed loggerhead turtle (<i>Caretta caretta</i>) and Kemp's ridley turtle (<i>Lepidochelys kempii</i>) occur in the waters of Narragansett Bay. Appropriate agencies will be consulted to find ways to minimize adverse effects to the listed species and its habitat from monitoring activities.

TABLE 11
ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
ALTERNATIVE OS-2: LIMITED ACTION
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN, NEWPORT, RHODE ISLAND

FEDERAL REQUIREMENTS

Requirement ¹	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
Resource Conservation and Recovery Act (RCRA), Subtitle C - Standards for Hazardous Waste Facilities	42 USC 6291 <i>et seq.</i> ; 40 CFR Part 264	Relevant and Appropriate	RI is delegated to administer the federal RCRA statute through its state regulations. The standards of 40 CFR Part 264 are incorporated by reference.	Wastes derived from monitoring will be tested to determine if they are hazardous waste. Monitoring will determine whether any contamination present poses a risk to the environment.
Resource Conservation and Recovery Act (RCRA), Subtitle D - Standards for Solid Waste Facilities	40 CFR Part 258	Applicable	Sets standards for location restrictions, operating criteria, monitoring, closure, and post-closure.	Areas of offshore sediments that are not classified as hazardous waste will be monitored in accordance with the substantive provisions of these standards.
STATE OF RHODE ISLAND REQUIREMENTS				
Hazardous Waste Management - Identification and Listing of Hazardous Wastes	RIGL 23-19.1; CRIR 12-030-003 (3.25)	Relevant and Appropriate	RI is delegated to administer the federal RCRA statute through its state regulations. The standards of 40 CFR Part 261 regarding RCRA identification and listing are incorporated by reference.	Wastes derived from monitoring will be tested to determine if they are hazardous waste. Monitoring will determine whether any contamination present poses a risk to the environment.
Hazardous Waste Management - Standards for Treatment, Storage, and Disposal Facilities	RIGL 23-19.1; <i>et seq.</i> ; CRIR 12-030-003 (10.00)	Relevant and Appropriate	Outlines specifications and standards for design, operation, closure, and monitoring of performance for hazardous waste storage, treatment, and disposal facilities. The standards of 40 CFR Part 264 are incorporated by reference.	Monitoring activities within areas containing hazardous waste will comply with these standards.

TABLE 11
ASSESSMENT OF ACTION-SPECIFIC ARARs AND TBCs
ALTERNATIVE OS-2: LIMITED ACTION
MARINE SEDIMENT/MANAGEMENT OF MIGRATION ROD
MCALLISTER POINT LANDFILL, NSN, NEWPORT, RHODE ISLAND
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Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain ARAR
STATE OF RHODE ISLAND REQUIREMENTS (cont'd)				
Refuse Disposal - Solid Waste Management Facilities	RIGL 23-18.9 <i>et seq.</i> ; CRIR 12-030-21	Applicable	Rules and regulations more stringent than the federal standards under 40 CFR Part 258 are applicable. The standards require minimization of environmental hazards associated with the operation of solid waste facilities.	Monitoring of non-hazardous sediments will satisfy the substantive requirements of these provisions.
Water Pollution Control - Water Quality	RIGL 42-16 <i>et seq.</i> ; CRIR 12-190-001	Applicable	Establishes water use classification and water quality criteria for waters of the state.	Monitoring and institutional control measures will not cause degradation of surface water quality in Narragansett Bay.
Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases	DEM-DSR-01-93 Section 8.01 §§ A to D	Relevant and Appropriate	This section regulates impacted media at contaminated sites.	This section will be used as a performance measurement during post-remedial sampling. If such sampling indicates an unacceptable human health risk, further action will be required and an additional decision document may be issued.

any associated changes in ecological risks. The relatively low contaminant concentrations in the offshore area are not expected to pose a significant threat to the environment. The estimated present-worth cost of this Selected Remedy is \$657,000. While both OS-3 (Capping, estimated present-worth cost \$20,904,000) and OS-4 (Dredging and Disposal, estimated present-worth cost \$44,043,000) would provide long-term protection from site contaminants, they are substantially more expensive and cause significant short-term and long-term disruption of the marine environment. It was concluded that OS-3 and OS-4 would provide less overall protection of the environment than the other alternatives because the impacts of the remedial actions would be greater than the reductions in contaminant-related risk. OS-1 is not effective because there is no regular monitoring to ensure that the remedy remains protective. Therefore the Navy concluded that OS-2 was the most cost-effective alternative considered.

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

The Navy has determined that the Selected Remedies represent the maximum extent to which permanent solutions and treatments are practicable at this site. Of those alternatives that are protective of human health and the environment and comply with ARARs, the Navy has determined that the Selected Remedy provides the best balance of trade-offs among the five balancing criteria, while considering state and community acceptance. Based on the extent and location of the contaminated sediments and the fact that the contaminated sediments are intermixed with solid waste (landfill) materials that require land disposal, the Navy and EPA concluded that segregation and treatment of the dredged materials was not a practicable alternative at this site.

The selected near shore remedy (NS/ER-5) confronts the risks in the nearshore and elevated-risk offshore areas by permanently removing contaminated sediments and placing them in a secure, RCRA-compliant landfill. This solution is the one that is most clearly effective in the long-term. While this solution does not utilize treatment, it does reduce the mobility of contaminants. The short-term risks of the selected remedy are similar to those of other alternatives. While NS/ER-5 is more costly than other alternatives, it provides a more permanent solution to contamination.

The selected offshore remedy (OS-2) monitors offshore sediments to ensure that contaminated sediment continues to pose no significant ecological risk. While none of the remedies utilize treatment to deal with sediment contamination, OS-2, OS-3, and OS-4 were all considered to be effective in the long-term. OS-2 has virtually no short-term impacts and no long-term impacts, unlike OS-3 and OS-4 which would require extensive mitigation against short-term effects and may have permanent long-term impacts to sensitive

eelgrass habitats. OS-2 is more easily implemented and costs considerably less than alternatives OS-3 and OS-4, and it would provide greater overall protection of the environment than OS-3 and OS-4.

Preference for Treatment as a Principal Element

As noted above, the Navy determined that treatment was not a practicable alternative at this site because of the nature and volume of contaminated materials.

Five Year Review Requirements

Statutory reviews are required within five years of the initiation of the first remedial action at a site if any hazardous substances, pollutants, or contaminants remain on site. When NS/ER-5 is fully implemented, the nearshore areas of the site will be cleaned up so that hazardous substances are reduced to levels that allow unlimited use and unrestricted exposures. For these specific areas, there will be no requirement for five-year review. However, because contaminated materials will remain beneath the revetment (between the landfill cap and the nearshore area) it will be necessary to monitor the area and conduct 5-year reviews to evaluate potential contaminant migration into the clean backfill materials. The 5-year reviews could be terminated based on regulatory agency approval provided that the monitoring data indicate that the remedy remains protective and that there is no unacceptable risk to human health or the environment. The 5-year reviews associated with the source control ROD (groundwater and landfill gas monitoring) will continue until a determination is made that no unacceptable risk to human health or the environment exists.

When OS-2 is fully implemented, hazardous substances may remain in the offshore sediments at levels at or above those that allow for unlimited use and unrestricted exposure. Therefore a review will be conducted within five years of the initiation of this Selected Remedy to ensure that the remedy continues to provide adequate protection of human health and the environment. The need for subsequent reviews or additional remedial actions will be determined by the Navy and regulatory agencies based on the results of long-term monitoring.

2.13 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Marine Sediment/Management of Migration at the McAllister Point Landfill Site was released for public comment in June, 1999. The Proposed Plan identified Alternative NS/ER-5, dredging and disposing, as the Preferred alternative for addressing nearshore and elevated-risk offshore sediments. It identified OS-2, long-term monitoring, as the Preferred Alternative for addressing offshore contaminated sediments. The Navy reviewed all written and verbal comments submitted during the public

comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary.

PART 3: RESPONSIVENESS SUMMARY

The purpose of the responsiveness summary is to document the Navy's responses to the comments and questions raised during the public comment period on the Proposed Plan. The Navy considered all of the comments summarized in this section before selecting the remedy described in this ROD.

3.1 BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

In 1996 the Navy established a citizens advisory committee called a Restoration Advisory Board (RAB) to assist the Navy in addressing Installation Restoration (IR) program sites, such as the McAllister Point Landfill. The RAB meets monthly at NAVSTA Newport to discuss planned and ongoing activities at the IR sites on the base. The remedial alternatives for marine sediments were discussed at RAB meetings at various times during the development of the FS. Input provided by the RAB was considered during development of the FS, Proposed Plan, and ROD.

The FS for the marine sediments at the McAllister Point Landfill site was made available to the public in May 1999 and the Proposed Plan for the site was made available in June 1999. They can be found in the Administrative Record for this site and in the information repositories maintained at the Middletown, Newport, and Portsmouth, Rhode Island Public Libraries.

The notice of availability for the Proposed Plan was first published in the Newport Daily News and the Providence Journal – East Bay Edition on June 14, 1999. A public comment period on the Proposed Plan lasted from June 14 to July 14, 1999. An informational open house and Public Hearing was held on June 24, 1999 to present the Proposed Plan to the public and to solicit comments on the Navy's Selected Remedy. Representatives from the Navy, EPA, and the RIDEM were available at the meeting to discuss the public's questions and concerns about the site. A stenographer was present at the hearing to record the public's formal comments and comment cards were available for people to provide formal written comments.

3.2 COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND THE NAVY'S RESPONSE TO THOSE COMMENTS

Formal comments were received from four individuals or groups during the public comment period. These included one verbal comment provided during the public hearing and three sets of written comments. A transcript of the public hearing and the written comments are provided as Appendix B.

The rest of this section characterizes the comments received during the public comment period and articulates the Navy's response to those comments.

Comment 1: Two parties (the Aquidneck Island Citizen's Advisory Board [AICAB] and the Rhode Island Coastal Resources Management Council [CRMC]) requested that the Navy consider using dredged material from navigational dredging projects at Rhode Island marinas as backfill material to replace the materials dredged from the site.

Response: The Navy will coordinate with federal and state authorities to evaluate whether the navigational dredging materials are suitable for use as backfill at the site. If materials are determined to be suitable (based on chemical characteristics and grain size) and the use of the materials is determined to be feasible, the Navy will coordinate with federal and state authorities to use as much of the material as possible. However, it should be noted that most dredged material from local marinas is comprised of fine grained material that is not suitable for backfill in a high energy environment.

Comment 2: AICAB requests that the Navy present the results of the pre-design investigation to the community for review prior to final selection of the cleanup approach. Specifically, AICAB request 1) the results of pre-design sampling, 2) a description of the revised area and depths subject to cleanup based on pre-design sampling, 3) a revised cost estimate for implementing the nearshore dredging remedy.

Response: The Navy will provide the requested information for review at the conclusion of the pre-design investigation.

Comment 3: AICAB requests that the Navy provide a revised cost estimate for the proposed alternative that includes the additional costs associated with completion of the project in phases.

Response: The cost estimates included in the FS, Proposed Plan, and ROD are based on one mobilization and one demobilization. It was assumed that dredging could be conducted outside the normal dredging windows, therefore, multiple mobilizations would not be required. The Navy has budgeted these funds to complete the project as estimated. If it appears based on the results of the pre-design investigation that the project will have to be phased, a revised cost estimate will be completed to reflect the anticipated construction schedule. If the cost of the Selected Remedy is either 50% greater or 30% less than the estimated costs herein, an Explanation of Significant Differences will be prepared.

Comment 4: AICAB requests that the McAllister landfill not be used for disposal of dredged materials.

Response: Comment noted. The Navy plans to use the McAllister Point landfill for disposal only if there is a significant cost advantage to doing so. If most of the dredged materials are determined to be non-hazardous (as expected) and off site disposal costs are comparable to or less expensive than the estimated cost for disposal in the McAllister landfill, the Navy's preference is to dispose of the materials off site. However, because a detailed analysis of costs has not yet been completed, it is important to keep this disposal option open.

Comment 5: AICAB notes that because the contaminant levels reported for the offshore areas are below the recommended PRGs, no cleanup is required in the offshore area in order to be protective of the environment. Therefore, AICAB requests that monitoring of the offshore areas be addressed as part of monitoring of the nearshore areas and "No Action" (Alternative OS-1) be selected as the remedy for the offshore areas.

Response: Although the contaminant levels detected in offshore samples are below the recommended PRGs, an intermediate probability of ecological risk was identified in parts of the offshore area. Therefore, monitoring is required in the offshore area to ensure that the remedy is protective and that the contaminants in the offshore sediment do not adversely effect human health or the environment.

The details of the monitoring plan (*e.g.*, specific locations, types of analyses, number of samples) will be worked out during remedial design in an open process involving the Navy, regulatory agency, and citizens' advisory groups. The duration of monitoring will be determined based on the monitoring results and the decision-making framework established in the monitoring plan.

Comment 6: AICAB requests that if any eelgrass beds are removed during the dredging activities, the Navy actively re-establish those beds in the first year following completion of the dredging.

Response: It is not anticipated that the proposed dredging will result in removal of eelgrass beds. However, if eelgrass beds are removed or significantly damaged, active restoration efforts would be conducted to comply with the requirements of the Clean Water Act.

Comment 7: AICAB requires that the Navy, EPA, and RIDEM apply value engineering throughout the project to accomplish cleanup objectives while reducing costs.

Response: Value engineering will be applied throughout the project.

Comment 8: AICAB requests that the Navy make every effort to have their remediation contractors incorporate the use of local subcontractors into the cleanup at McAllister landfill.

Response: It is the Navy's policy to use local labor and local subcontractors to the maximum extent practicable. This policy will be followed during implementation of the Selected Remedy.

Comment 9: Ms. Claudette Weissinger of the RAB Public Information Committee commented that she did not feel that Open House held on June 24, 1999 fulfilled the need of the public to be informed of the Navy's proposed cleanup. She stated that a focused public meeting would have been a more appropriate and meaningful way for the public to properly evaluate the remedial plan and asked if this format would continue to be used by the Navy.

Response: Comment noted. The Navy used the "open house" format in an attempt to better communicate information about the proposed cleanup plan to the public. To our knowledge, everyone who wanted to make comments or ask questions was able to do so using the new format. The "open house" format has been used successfully at other Naval Stations across the country and has been found by many to be preferable to the more standard public meeting format. The Navy has not determined what format it will use in the future to communicate information about NAVSTA Newport sites to the public.

Comment 10: Ms. Joyce Morgenthauer commented that the site has been a big problem for a very long time and that something should be done, but she doesn't know what.

Response: Comment Noted.

REFERENCES

B&RE (Brown & Root Environmental), 1997a. *Technical Memorandum for Phase III Investigations, McAllister Point Landfill Marine Ecological Risk Assessment*, Naval Education and Training Center, Newport, RI, April.

B&RE (Brown & Root Environmental), 1997b. *(Draft Final) Remedial Investigation Report and Human Health Risk Assessment*, Naval Education and Training Center, Newport, RI, April.

B&RE (Brown & Root Environmental), 1997c. *McAllister Point Landfill Quarterly Groundwater Monitoring Report (performed March 1997)*, Naval Education and Training Center, Newport, RI, June.

B&RE (Brown & Root Environmental), 1997d. *McAllister Point Landfill Second Quarterly Monitoring Report (performed June and July 1997)*, Naval Education and Training Center, Newport, RI, October.

Envirodyne (Envirodyne Engineers, Inc.), 1983. *Initial Assessment Study*, Naval Education and Training Center, Newport, RI.

SAIC (Science Applications International Corporation)/URI (University of Rhode Island), 1997. *(Final) Marine Ecological Risk Assessment Report*, prepared under contract with Brown and Root Environmental for the Navy, March.

Tetra Tech NUS, 1999a. *Feasibility Study for Marine Sediment/ Management of Migration, McAllister Point Landfill*. Naval Station Newport, Newport, RI. Final report - February 1999, Revision 1 - May 1999.

Tetra Tech NUS, 1999b. *Proposed Plan, McAllister Point Landfill Site*. Naval Station Newport, Installation Restoration Program, Middletown, RI.

TRC (TRC Environmental Corporation), 1993a. *(Draft Final) Focused Feasibility Study Report, Site 01 - McAllister Point Landfill*, Naval Education and Training Center, Newport, RI.

TRC (TRC Environmental Corporation), 1993b. *Record of Decision, Source Control Operable Unit, Site 01 – McAllister Point Landfill*. Naval Education and Training Center, Newport, RI.

TRC (TRC Environmental Corporation), 1994a. *(Draft Final) Remedial Investigation Report (Volume I) for the McAllister Point Landfill*, Naval Education and Training Center, Newport, RI, July.

TRC (TRC Environmental Corporation), 1994b. *(Draft Final) Human Health Risk Assessment Report (Volume II of RI Report) for the McAllister Point Landfill*, Naval Education and Training Center, Newport, RI, July.

TRC (TRC Environmental Corporation), 1994c. *(Draft) Feasibility Study, Management of Migration, McAllister Point Landfill*, Naval Education and Training Center, Newport, RI, October.

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APPENDIX A
RIDEM CONCURRENCE LETTER



RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

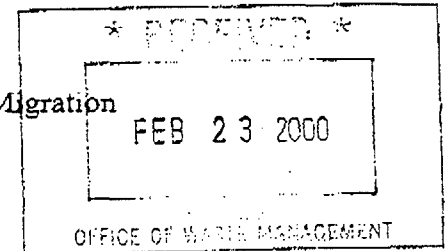
235 Promenade Street, Providence, RI 02908-5767

TDD 401-831-5508

22 February 2000

Ms. Patricia Meaney, Director
Office of Site Remediation and Restoration
U.S. Environmental Protection Agency, Region 1
1 Congress Street, Suite 1100
Boston, MA 02114-2023

RE: Record of Decision for Marine Sediment/Management of Migration
McAllister Point Landfill
Naval Station Newport, Newport, Rhode Island



Dear Ms. Meaney:

On 23 March 1992, the State of Rhode Island entered into a Federal Facilities Agreement (FFA) with the Department of the Navy and the Environmental Protection Agency (EPA). One of the primary goals of the FFA is to insure that the environmental impacts associated with past activities at the Naval Station Newport base located in Newport, Rhode Island are thoroughly investigated and that appropriate actions are taken to protect human health and the environment.

Through our mutual efforts we have learned that the McAllister Point Landfill was created by filling in significant portions of Narragansett Bay. While the initial operable unit (OU1 - Source Control) addressed the area of greatest initial concern given its known use as a disposal area for large quantities of industrial waste, this second operable unit (OU2 - Marine Sediment/Management of Migration) is, and has always been, of equal importance to RIDEM. We believe that the controls we implemented on the primary source area have greatly stemmed the migration of contamination to the Bay. This second operable unit addresses the issue of removing waste that remains buried improperly in the bay and the risks posed by chemical contamination that has historically emanated from the landfill.

In accordance with the FFA, the Department has reviewed this Record of Decision dated February 2000. Our review of this document, combined with our knowledge of this site gathered through our historical involvement in the investigation phases has determined that the selected remedy achieves our primary goal of protectiveness. Therefore, in accordance with Section 17.3 of the FFA, the Department offers its concurrence with the selected remedy as detailed in the Record of Decision.

In regards to the process carried out at this site RIDEM has always been concerned about the issue of selecting a cost-effective remedy. During the decision-making process for the Source Control ROD, OU1 in 1993, we repeatedly expressed concerns over segmenting the site

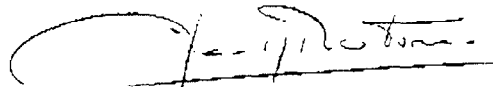
into operable units. It was always our belief that a comprehensive remediation plan would have been more protective of the environment by allowing for a faster cleanup, and more cost effective by allowing for the disposal of contaminated debris/sediments under the landfill cap. To achieve this goal the State requested that the ROD for OU1 require this evaluation. In addition, the State requested that the ROD for OU2, Management of Migration, be issued sufficiently prior to the commencement of construction of the OU1 so that appropriate changes, if necessary, may be implemented in the final remedial design for the OU1. Unfortunately, this did not occur, and our concerns have been validated; it has taken seven years to finally address the offshore component of the remedy and the cost of implementing this portion of the remedy have escalated.

As you are aware, the final steps in finalizing ROD for this operable unit were delayed by EPA's hesitation to accept the State's Site Remediation Regulations as ARARs. The State's regulatory requirements are more protective than those outlined under CERCLA and have been consistently applied to other sites in the State. Therefore, there should not have been a delay in accepting the State's regulations as ARARs at this site. The Department hopes that future delays of this nature will be avoided at other Superfund sites.

Finally, RIDEM's role in this process does not end with the signing of this ROD. As a natural resource trustee, we are faced with the challenge of assessing the historical damages that have been inflicted to the offshore environment as a result of this landfill and to determine what we, along with the other trustees, must do to repair those injuries to the ecosystem. We hope that we are able to work cooperatively with the Navy in assessing these damages and implementing a restoration plan. We believe our efforts to date are the most important steps toward any restoration plan.

Thank you for the opportunity to review and concur with this important Record of Decision.

Sincerely,



Jan H. Reitsma
Director

cc: Mindy Lubber, Acting Regional Administrator, USEPA, New England
Captain A.C. Oakleaf, USN
Terrence Gray, Assistant Director, RIDEM
Leo Hellested, RIDEM OWM
Warren Angell, RIDEM OWM
Claude Cote, RIDEM OLS

APPENDIX B
COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD

MCALLISTER POINT LANDFILL SITE

NAVAL STATION NEWPORT, NEWPORT, RHODE ISLAND

CONTRACT NO. N82472-80-D-1298

An OPEN HOUSE and PUBLIC HEARING in the above-entitled matter, taken on behalf of TETRA TECH NUS, before Carol J. Mutty, a Notary Public in and for the State of Rhode Island, at Joseph H. Gaudet Middle School, 1113 Aquidneck Avenue, Middletown, Rhode Island, on the 24th day of June 1999, at 3 p.m.

* * * * *

IRONS & ASSOCIATES

11 South Angell Street #359

Providence, RI 02906

401 881-1905

1 MS. JOYCE MORGENTHALER: I just feel it's been a
2 big problem for a very long time, and I feel something
3 should be done, and I don't know what. I'm not
4 knowledgeable to make that decision, but I really do.
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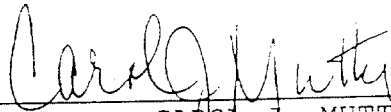
C E R T I F I C A T I O N

I, CAROL J. MUTTY, do hereby certify that I am expressly approved as a person qualified and authorized to take depositions pursuant to Rules of Civil Procedure of the Superior Court, especially, but without restriction thereto, under Rule 30 (e) of said Rules.

I further certify that I am a Notary Public in and for the State of Rhode Island, duly commissioned and qualified to administer oaths, and do hereby certify that the foregoing hearing, taken on behalf of Tetra Tech NUS, was taken before me at Joseph H. Gaudet Middle School, 1113 Aquidneck Avenue, Middletown, Rhode Island, on the 24th day of June 1999 at 3:00 p.m.

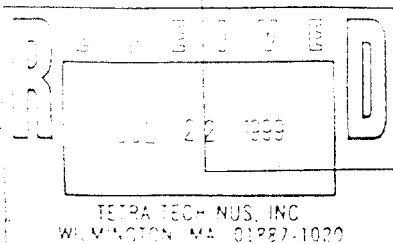
I further certify that the foregoing hearing was taken down by me in machine shorthand and was later transcribed, and that the foregoing transcript is a true and accurate record of the proceedings.

IN WITNESS WHEREOF, I have hereunto set my hand and my seal this 28th day of June 1999.



CAROL J. MUTTY
CERTIFIED PROFESSIONAL REPORTER and NOTARY PUBLIC

IN RE: MCALLISTER POINT LANDFILL SITE



IRONS & ASSOCIATES
(401) 861-0909

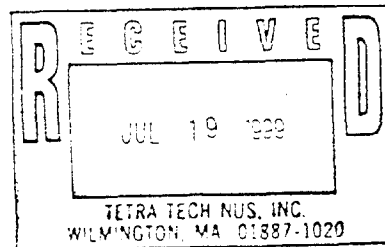
Use This Space to Write Your Comments

Or to be added to the mailing list

The Navy wants your written comments on the options under consideration for reducing risk from sediments in Narragansett Bay that have been contaminated by chemicals from the McAllister Point Landfill. You can use the form below to send or fax written comments. If you have questions about how to comment, please call Melissa Griffin at 401-841-6375. This form is provided for your convenience. Please mail this form or additional sheets of written comments, postmarked no later than date, year to:

Melissa Griffin
NAVSTA Newport IR Site Manager
PWD, Building 1
1 Simonpietri Drive
Newport, RI 02841
Fax: (401) 841-7071

Or E-mail to
Melissa Griffin at melissa.griffin@smtp.cnet.navy.mil



As a PAB member I do not feel that the McAllister Point Landfill open house held at the Grout School on Thursday, June 24, 1999 fulfilled the need of the public to be informed of the Navy's proposed off-site clean up.

A focused public meeting would have been a more appropriate and meaningful method for the to.s. public (public) to properly evaluate the Navy's remedial plan.

Will this continue to be the Navy's "public meeting"?

(Use reverse side and attach sheets as needed)

Comments Submitted by:

Claudette E. Krissinger
Public Information Committee

MAILING LIST ADDITIONS, DELETIONS OR CHANGES

If you did not receive this through the mail and would like to

- ☐ be added to the site mailing list
- ☐ note a change of address
- ☐ be deleted from the mailing list

Name: _____

Address: _____

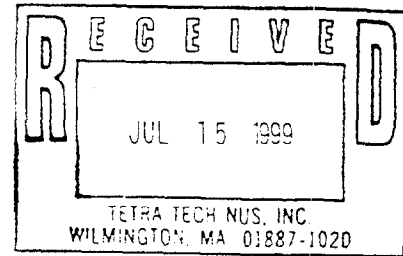
please check the appropriate box and fill in the correct address information above.



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

COASTAL RESOURCES MANAGEMENT COUNCIL

Oliver H. Stedman Government Center
4808 Tower Hill Road
Wakefield, R.I. 02879-1900
(401) 277-2476



July 7, 1999

5278 3.1
NAVY-IN-0634

Melissa Griffin
NAVSTA Newport RI Site Manager
PWD, Building 1
1 Simonpietri Drive
Newport, RI 02841

Dear Ms. Griffin:

Thank you for the documents you provided during the hearing on June 24 on the proposed work to be done at the McAllister Point Landfill Site.

The Coastal Resources Management Council was given the responsibility under the Marine Infrastructure Maintenance Act of 1996 to find in water sites for disposal of sediments that need to be dredged from Marinas around the state. The third item in the proposed plan "backfill the dredged area with clean material" is of interest to us as we seek to fulfill our mandate.

The marinas in this state have approximately 900,000 cubic yards of material that needs to be dredged and disposed. We would like you to consider taking dredged material from Rhode Island marinas to backfill approximately 34,000 cubic yards of dredged area at McAllister Point. Many marinas have material that qualifies as suitable for open water disposal or clean under EPA guidelines. Some of the marinas, particularly those in the East Passage area, may have sediments that are not appropriately clean and comparable in grain size to the surrounding sediments at your site.

Thank you for considering this comment on the proposed plan. We are available to meet with you at the appropriate time to discuss this option for the sources of clean material for backfill at your site.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

GJF:jmm

Use This Space to Write Your Comments

Or to be added to the mailing list

The Navy wants your written comments on the options under consideration for reducing risk from sediments in Narragansett Bay that have been contaminated by chemicals from the McAllister Point Landfill. You can use the form below to send or fax written comments. If you have questions about how to comment, please call Melissa Griffin at 401-841-6375. This form is provided for your convenience. Please mail this form or additional sheets of written comments, postmarked no later than *date*, year to:

Melissa Griffin
NAVSTA Newport IR Site Manager
PWD, Building 1
1 Simonpietri Drive
Newport, RI 02841
Fax: (401) 841-7071

Or E-mail to

Melissa Griffin at melissa.griffin@smtp.cnet.navy.mil

The TAG understands that there are numerous navigational dredging projects planned throughout the bay. While some of these may be in areas potentially impacted by contaminants, it is anticipated that some of this dredging will generate "clean" fill (i.e., below the PRGs for McAllister sediments). The use of materials dredged from other locations could significantly reduce the costs of the proposed cleanup (which includes many dollars for purchasing of clean backfill). The TAG group requests that the Navy coordinate with the appropriate entities (e.g., CRMC) to incorporate this approach into the remedial design.

(Use reverse side and attach sheets as needed)

Comments Submitted by: Aquidneck Island Citizens

Advisory Board

MAILING LIST ADDITIONS, DELETIONS OR CHANGES

If you did not receive this through the mail and would like to

- ☐ be added to the site mailing list
- ☐ note a change of address
- ☐ be deleted from the mailing list

Name: _____

Address: _____

please check the appropriate box and fill in the correct address information above.

June 24, 1999

Naval Station Newport
Middletown, RI

RE: Proposed Plan for Cleanup of McAllister Landfill - Nearshore and Offshore Areas, Superfund
Cleanup of NETC

Dear Sir or Madam:

The Navy is soliciting community input regarding plans to implement a Superfund cleanup at McAllister Landfill for the nearshore and offshore areas. The cleanup is being conducted under CERCLA, in accordance with the Federal Facility Agreement between the Navy, EPA and RIDEM. This letter serves to identify a few key areas identified by the Aquidneck Island Citizen's Advisory Board for consideration by the Navy, EPA and RIDEM.

The Proposed Plan includes dredging of contaminants in the nearshore area for an estimated cost of \$22.6 million and monitoring in the off-shore area for an estimated cost of \$657,000. Based on recent information presented by the Navy, the magnitude of costs for the nearshore dredging project would likely result in the cleanup being funded over a multi-year period, with little remaining funds available to continue other CERCLA activities at NETC. The limited availability of funding for cleanup activities at NETC (and other Navy sites) makes decision-making for allocation of those funds critical. The difficult decision for the community is whether the proposed cleanup of McAllister nearshore area is the best expenditure of funds at NETC for the next several years. Towards that end, the AICAB requests the following:

* The Navy is planning to conduct pre-design sampling in the nearshore area to refine the area requiring cleanup. The AICAB requests that the results of the pre-design sampling be presented to the community for review. Further, the AICAB requests that the Navy present a description of the revised area (and depths) subject to cleanup based on the pre-design sampling as well as a revised cost estimate for performing the work. The AICAB requests that the results of this pre-design sampling and revised cost analyses be performed and provided to the community for review prior to final selection of the cleanup approach.

* The Navy has indicated that the proposed cleanup of the nearshore areas of McAllister landfill cannot be funded in one year. Rather, it will be funded over three (or more years), requiring the work to be completed in phases. In addition, the cost estimate for the cleanup assumes that the normal time-of-year restrictions on dredging in the bay would not be in effect; the AICAB is not in a position to evaluate the realism of this assumption. Due to funding limitations and/or dredging time-of-year restrictions, it would appear that the cleanup would have to be conducted in two (or more) separate mobilizations/demobilizations. The AICAB requests that the Navy provide a revised cost estimate for the proposed alternative that includes additional costs associated with completion of the project in phases (including, but not limited to, additional contractor/equipment mobilizations, additional sampling between years of work, and allowances for demarcating/managing boundaries between clean and contaminated areas between periods of dredging).

The AICAB also wishes to express the following regarding the proposed cleanup alternative.

* The current plan states that the dredged materials from the nearshore areas will either be disposed under the existing cap at the McAllister landfill or will be sent off-site for disposal at an appropriate, permitted facility. According to information presented by the Navy, the costs for off-site disposal of non-

hazardous materials is comparable to the costs for disposing of the same materials at the McAllister landfill. Further, the majority of the materials to be dredged are expected to be considered non-hazardous. Therefore, the AICAB requests that McAllister landfill not be used for disposal of dredged materials.

* The contaminant levels reported in the offshore areas are all currently below the recommended cleanup levels (the PRGs). Accordingly, no cleanup is required in the offshore area in order to be protective of human health and the environment. Therefore, continued monitoring in the offshore area, as delineated in the Proposed Plan, does not appear to be productive. Rather, the AICAB recommends that some monitoring be performed in areas adjacent to the nearshore areas to assess migration from the nearshore areas. Once cleanup of the nearshore areas is complete, a final monitoring event will determine whether any migration resulted in contamination of other areas above PRGs. This monitoring should not necessarily be restricted to the offshore areas identified in the Proposed Plan yet it will also provide the required information to determine whether any further action is required in the offshore (or other) areas. Therefore, the AICAB requests that the offshore areas be addressed as part of the monitoring of the nearshore areas and that, otherwise, the "No Action" alternative appears to be appropriate for the offshore areas.

* The AICAB requests that the National Oceanographic and Atmospheric Administration (NOAA) and RIDEM begin the determination immediately of whether a Natural Resource Damage Assessment will be conducted for McAllister landfill (and other sites at NETC). The Aquidneck Island Planning Commission is currently developing a Master Plan for the island as a whole, and any shoreline restoration activities that would be potentially associated with the Natural Resource Damage Assessment are of great interest to the community. Given the time required to implement appropriate island planning, the AICAB requests that RIDEM and NOAA meet with AICAB to discuss this issue in the next two months.

* The Proposed Plan indicates that, following dredging and backfill, habitats will be allowed to re-establish themselves naturally. Previous studies and photographs of the area have identified some areas of eel grass in the McAllister Landfill area. Eel grass is not known for re-establishing itself quickly. Therefore, the AICAB requests that, if any eel grass beds are removed during the dredging activities, the Navy actively re-establish those beds in the first year following completion of the dredging.

* The costs for cleanup of the nearshore areas at McAllister landfill are high relative to the amount of funding available for NETC as a whole. Therefore, during the remedial design/remedial action phases of the cleanup, the AICAB requests that the Navy, EPA and RIDEM apply value engineering throughout the project to accomplish the cleanup objectives while reducing costs.

* The AICAB recognizes the benefits to the island of the cleanup activities at NETC. In addition to improved environmental conditions, the community also benefits from this cleanup through the involvement of local contractors. The AICAB requests that the Navy make every effort to have their remediation contractors incorporate the use of local subcontractors into the cleanup at McAllister landfill.

The AICAB appreciates the cooperation of the Navy, EPA and RIDEM in responding to our concerns. The AICAB requests that responses to all comments received on the Proposed Plan be provided to the AICAB and the community prior to issuance of the Record of Decision. In addition, the AICAB requests that the Navy, EPA and RIDEM capitalize on the "lessons-learned" from the assessment and cleanup of McAllister landfill to expedite the assessment and cleanup processes at other sites at NETC.

Aquidneck Island Citizens Advisory Board